TIPS • TOOLS • TECHNIQUES

ShopNotes®

Vol. 5 Issue 29

CRAFTSMAN Tool Chest

Rolling Tool Cabinet

- Revolving Hardware Bin
- Locking Rabbet Joints
- Belt Sanders
- Planer Tips
- Coloring Finishes

ShopNotes®
Issue 29 September 1996

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EDITOR'S NOTE

Cutoffs

I'm not much of an auto mechanic. But I always enjoy watching a good mechanic work (especially when he's working on my car).

Even though I don't always know exactly what's going on under the hood, there's one thing I *do* appreciate — the big rolling tool cabinet that's usually parked right next to him.

With its large banks of drawers crammed with wrenches, screwdrivers, and gauges, these metal tool boxes are like having a shop on wheels. And every single tool is just an arm's reach away.

I guess it's this easy access that appeals to me the most. In fact, I've even considered buying a rolling tool cabinet for my shop.

But there's one thing that always holds me back — they're made of metal. That's fine for a purely functional tool cabinet. But it just doesn't have the same comfortable "feel" of one that's made from wood.

ROLLING TOOL CABINET. To get the best of both worlds, the rolling tool cabinet featured on page 16 in this issue combines both function *and* solid wood construction.

It rolls right up next to your workbench (or wherever you happen to be working). So your tools are right at hand when you need them. No more wearing a path across the shop to get a tool you've overlooked. Or cluttering up the bench with tools that inevitably get knocked off or damaged.

TIME MACHINE. Yet as much as I like these practical things, it's the traditional appearance of this tool cabinet that makes me think I've taken a step back in time. Wood panels made from quartersawn red oak. Felt-lined drawers. And solid brass drawer pulls. We even colored our own finish to give it an old-time look. (For more on this, refer to the article on page 31.)

HEIRLOOM. All this adds up to making this tool cabinet one of the nicest projects we've ever featured in *ShopNotes*. Perhaps even an heirloom that will get passed down from one generation to the next.

But a project doesn't become an heirloom just because it's old. It also needs some kind of an emotional "tie."

CHEST. Take the tool chest shown on the back cover of this issue for instance. It might be nothing more than an old box to some people. But around here, it has a special meaning.

That's because the tool chest was built by Adolf C. Peschke, a carpenter who worked at the St. Louis Fixture Co. around the turn of the century. (If the last name sounds familiar, that's because it's the same as the one on the top of the list at the left. And Don is Adolf's grandson.)

Don started *ShopNotes* about five years ago to provide basic information for woodworkers like yourself.

But I'd say that the kernel of the idea to start this magazine might be traced back a long time ago. Back when Adolf decided he needed to build a simple box to keep his tools in order.

Tim

ISSUE NUMBER TWENTY-NINE

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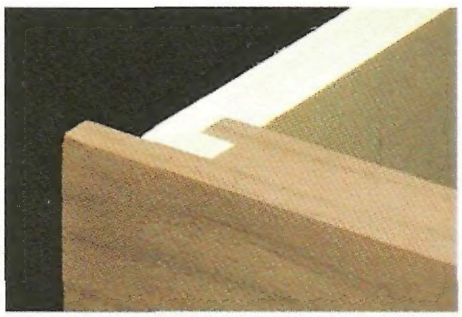


Locking Rabbets *page 14*

Rolling Tool Cabinet *page 16*

Revolving Parts Bin

This compact bin has thirty-two compartments for storing and organizing all your small parts and hardware.

One of the things that fascinated me as a kid was the circular nail bin at the local hardware store. I couldn't resist spinning the metal shelves and watching the piles of nails go by like a merry-go round.

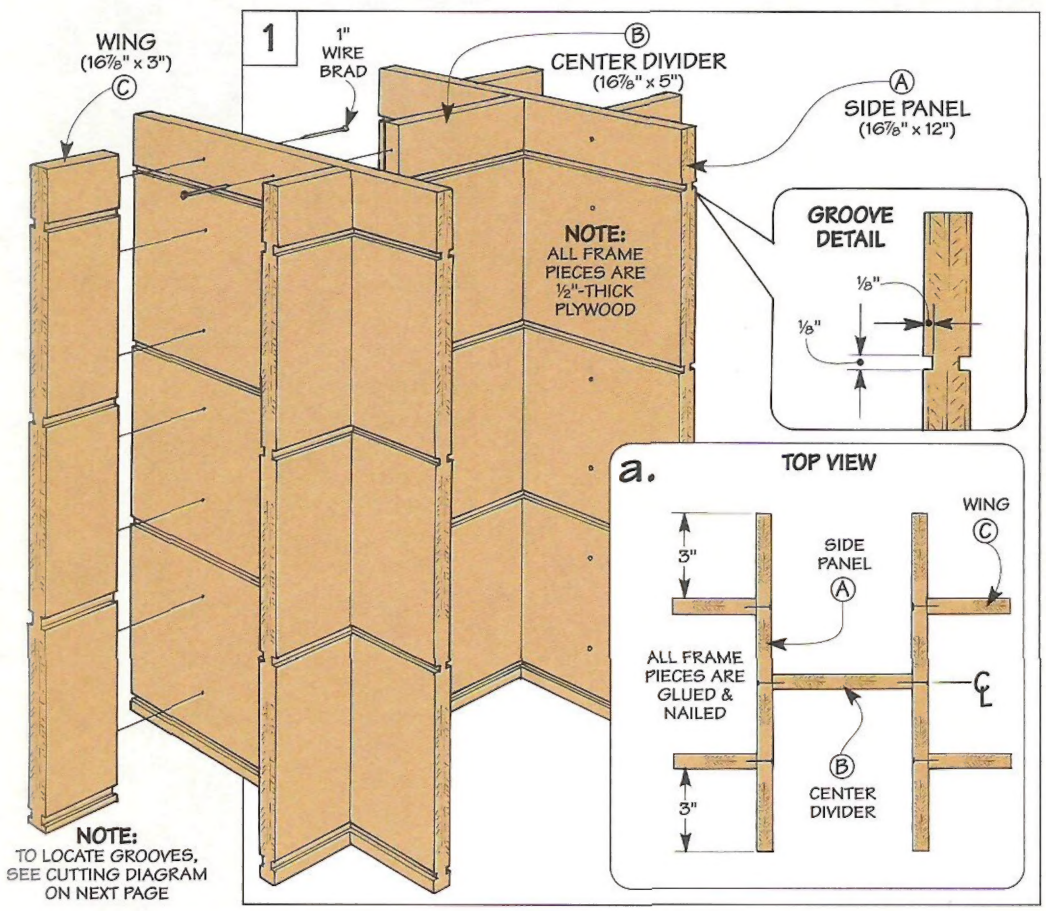
That same basic idea is what's behind this revolving parts bin. Four separate tiers (with eight compartments each) help organize small parts and pieces of hardware. To find the parts you need quickly and easily, the bin rotates on a lazy Susan bearing.

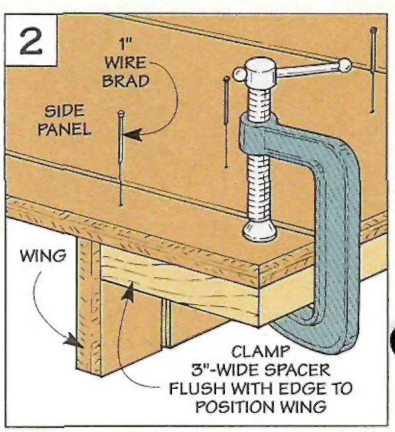
Although a bin with this many compartments might seem a bit complicated to build, that's not the case. A ½"-thick plywood frame (I used Baltic birch) serves as a "backbone" that runs all the way through the parts bin, see Fig. 1. Then hardboard bottom pieces are added to establish the individual compartments, see Fig. 3.

FRAME. The frame is basically an H-shaped assembly with two wings sticking out on each side, see Fig. 1a. To accept the bottom pieces, there's a groove in each side of the frame pieces.

To get these grooves to align, it's best to cut them before cutting the individual frame pieces to size. Start with a piece of plywood that's cut to the same width (height) as the frame (16⅞"), see Cutting Diagram on next page. And to allow "extra" for the saw kerfs when cutting the frame pieces to size, I cut it to a rough length of 43".

Now it's simply a matter of cutting the grooves on both sides of the plywood, see detail in Fig. 1. Just be sure to use the same fence setup for each pair of grooves. Then cut the two *side panels (A)*, a *center divider (B)*, and the four *wings (C)* to final length, see Fig. 1.





ASSEMBLY. At this point, the frame is ready to be assembled. To make it easy to fit wood fronts on the bin later, the idea is to make one side of the frame a mirror image of the other.

To do this, I started by gluing and nailing two wings to each side panel. Note: Clamping a spacer to the side panels helps position each wing the same distance in from the edge, see Fig. 2. Then glue and nail these two assemblies to the center divider.

BOTTOM PIECES. With the frame complete, you're ready to add the bottom pieces, see Figs. 3 and 3a. Each tier has three different size bottoms made from 1/8"-thick hardboard: two large *center bottom (D)*, two smaller *side bottom (E)*, and four *corner bottom pieces (F)*, see Fig. 3.

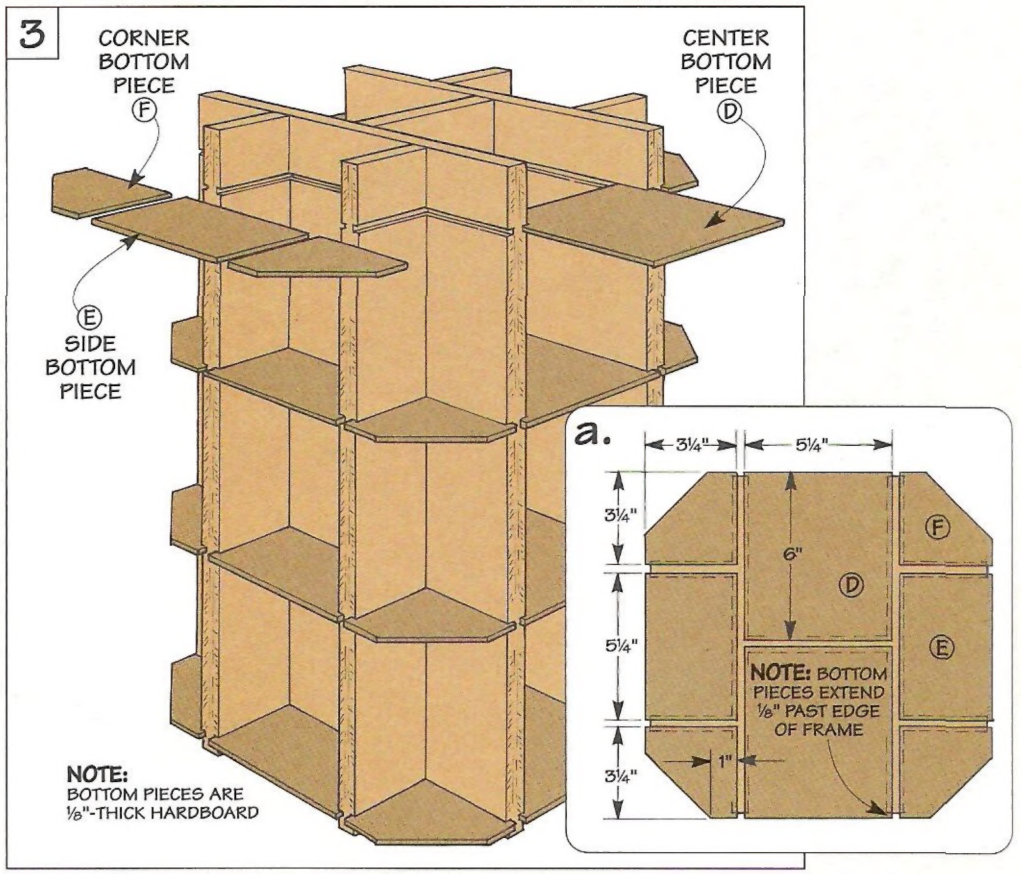
Cutting the rectangular bottom pieces (D and E) is fairly straightforward, see Fig. 3a. They're cut to fit the grooves and allow an 1/8" overhang for the wood facing strips that are added later.

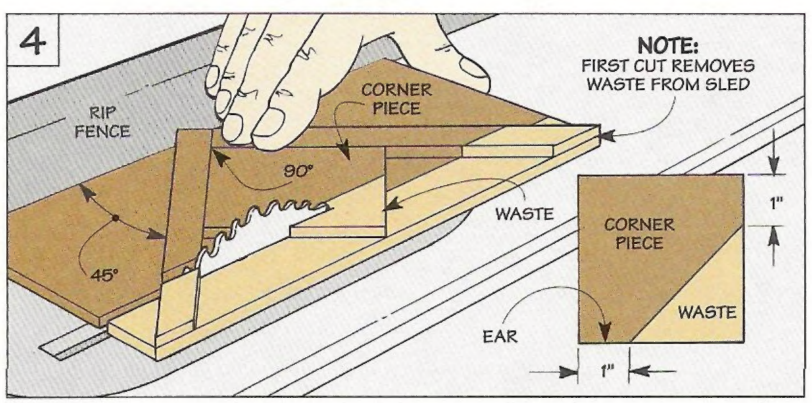
ANGLED CUTS. But making the angled cuts on the small corner pieces (F) is a bit trickier. To do this safely, I used a simple sled that carries the pieces through the saw blade at a 45° angle. It's just a wide (6") piece of hardboard with two narrow strips attached to form a 90° corner (I used carpet tape).

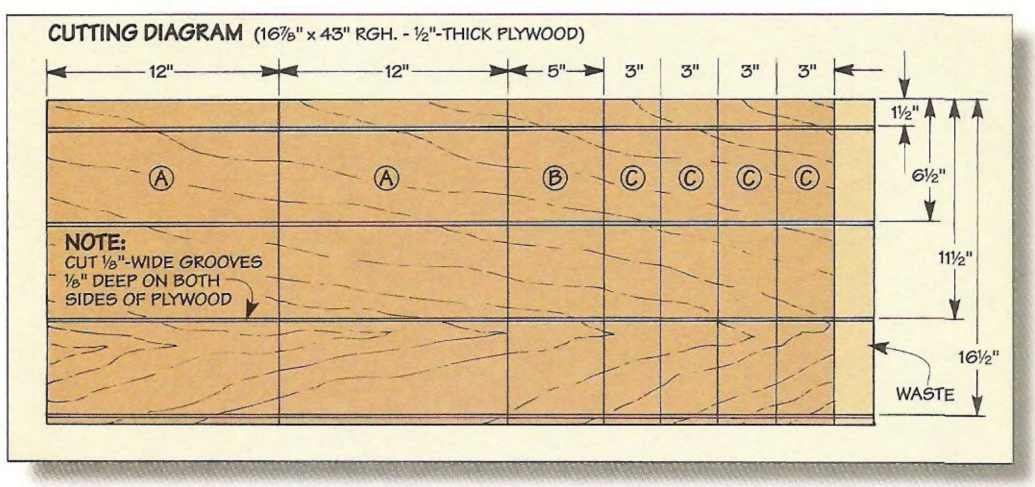
Setting the corner pieces in the sled automatically positions them so they're 45° to the saw blade. But you still need to adjust the rip fence to end up with two 1"-wide "ears."

What works well here is to start by taking an extra-wide cut. Then reposition the fence closer to the blade and sneak up on the final width of cut.

After cutting all the bottom pieces, it's simply a matter of gluing them tightly into the grooves cut earlier in the frame.







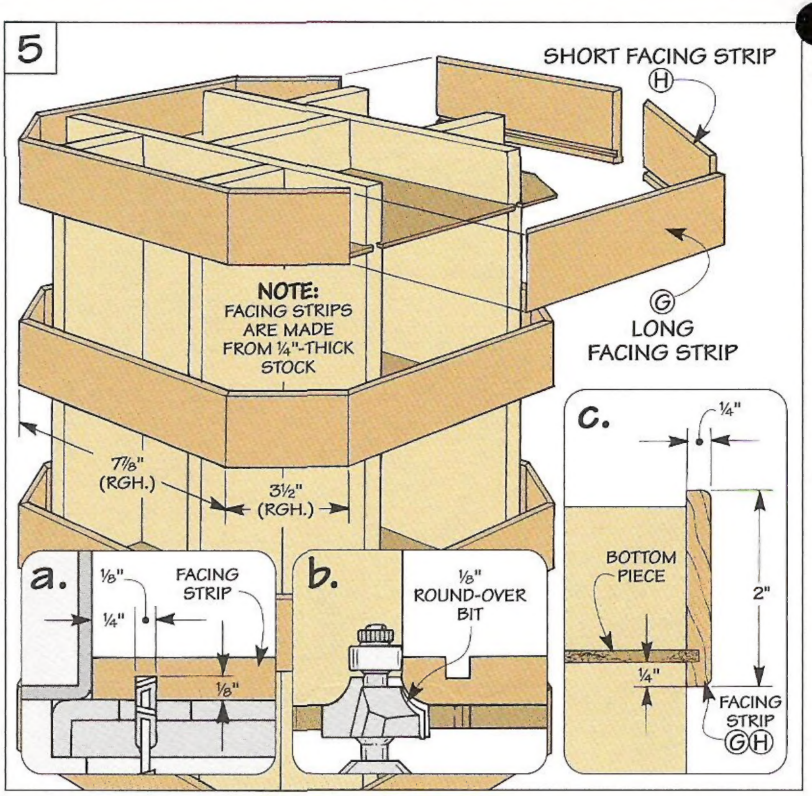
Facing Strips

To keep hardware from spilling out of the compartments, each tier is "wrapped" with wood facing strips, see Fig. 5.

These strips are 1/4"-thick pieces of hard maple that are mitered on the ends where they come together. To fit over the bottom pieces, there's a groove on the inside face of each strip.

Here again, it's easiest to cut these grooves before making the individual strips. So start by ripping about 18 linear feet of 1/4"-thick stock to width. This provides enough material for all the facing strips and a bit extra for making a couple of test pieces.

Now just cut the grooves to fit the bottoms, see Figs. 5a and 5c. Before cutting the strips to length, I softened the sharp corners on the outside by routing a roundover on the top and bottom edges, see Fig. 5b.



Hardware

- (1) 12"-Dia. Lazy Susan Bearing
- (32) 2 1/2" Brass Label Holders
- (64) 1/4" Brass Tacks
- (8) #6 x 1" Fh Woodscrews
- (4) #10 x 5/8" Rh Sheet Metal Screws
- (40) 1" Wire Brads

ShopNotes Project Supplies is offering a complete hardware kit to build the revolving parts bin.

To order, call: 800-347-5105.

6829-100.....$27.95

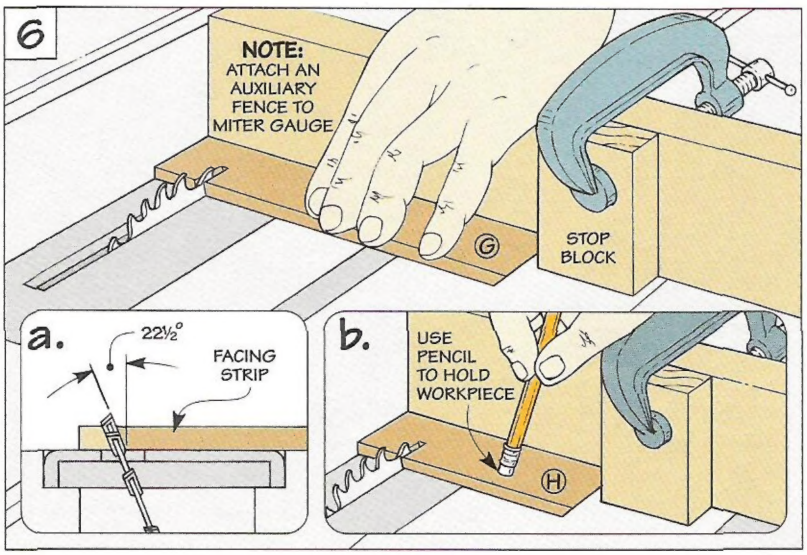
MITERS. At this point, you're ready to cut the miters on the ends of the facing strips. There are two things that affect the fit of these miters: the angle of the blade and the length of the strips.

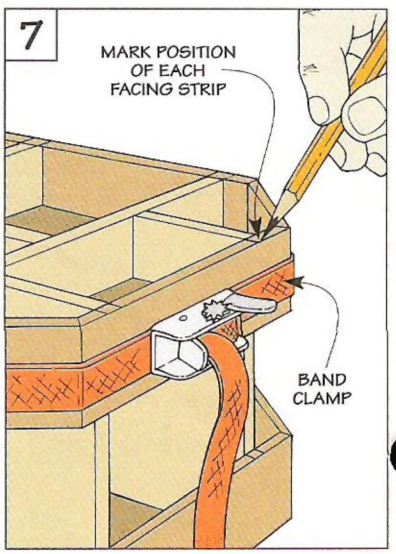
ANGLE. Since there are eight strips on each tier, you'll need to adjust the saw blade to make a 22 1/2° cut, see Fig. 6a. An easy way to check this angle is to cut miters on the ends of two test pieces. If they fit together tightly when held against the frame, you can concentrate on cutting the facing strips to length.

LENGTH. Each tier has four *long facing strips (G)* and four *short strips (H)*, see Fig. 5. Determining the length of these pieces to get a good fit all the way around each tier is a trial and error process. But it's not as difficult as it sounds.

Rather than fitting them one by one, the idea here is to get all eight strips to fit together at the same time. To make this work, each long (or short) piece needs to be the exact same length.

To sneak up on the final length, I started by cutting all the strips an 1/8" longer than





needed, see Fig. 5. Clamping a stop block to an auxiliary fence attached to the miter gauge ensures accuracy, see Fig. 6. And a pencil makes a handy hold-down, see Fig. 6b.

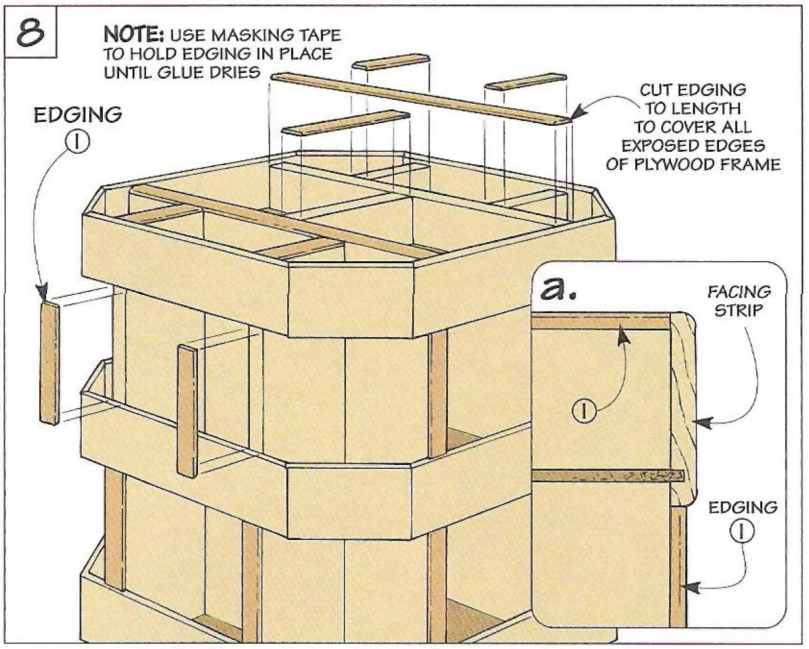
After test fitting the strips (I used a band clamp) you may need to trim off just a bit. Just be sure you cut all the long (or short) pieces to the same length.

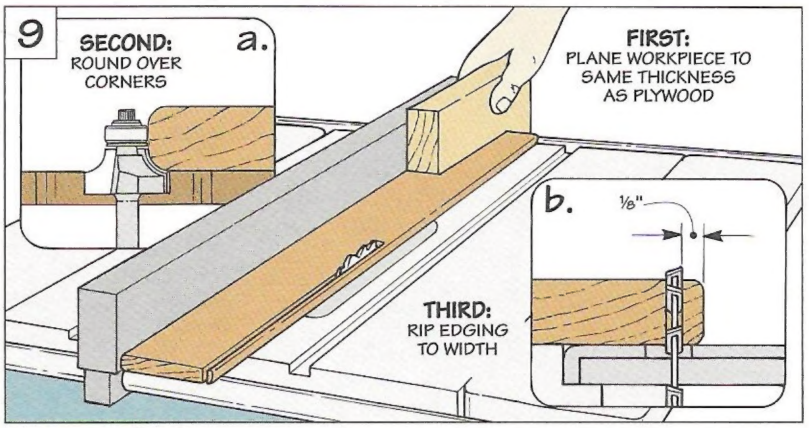
Once you're satisfied with the fit, it's a good idea to mark the location of each strip, see Fig. 7. This makes it easy to reposition them during glue-up.

EDGING. With the facing strips in place, I covered the exposed plywood edges of the frame with thin strips of hardwood edging (maple), see Fig. 8.

But cutting these strips safely on the table saw can be a challenge. So I started by planing a wide workpiece to the same thickness as the plywood. Then after rounding over the edges (Fig. 9a), I ripped an ⅛"-wide strip so it falls to the waste side of the blade, see Figs. 9 and 9b. (You'll need about 10 linear feet.)

Now it's just a matter of cutting short pieces of *edging (I)* to fit and gluing it in place.





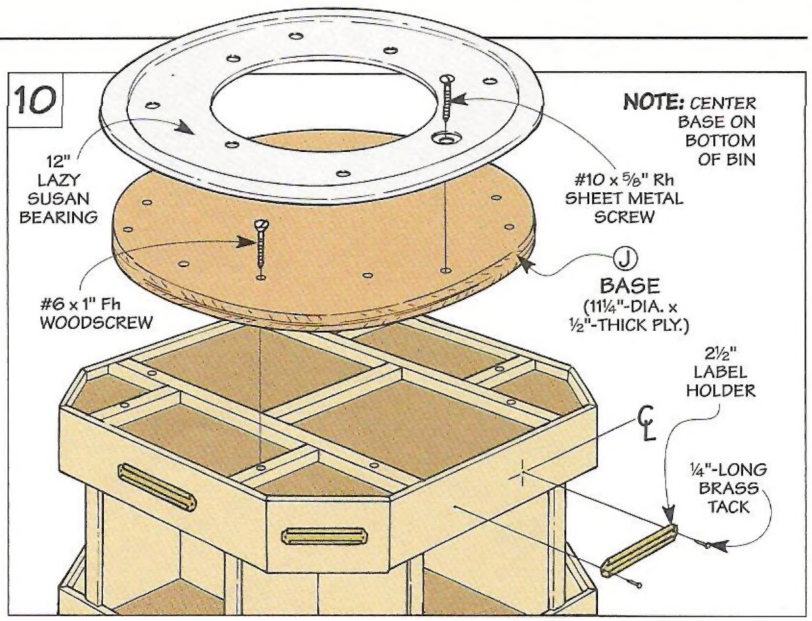
To provide more working time when gluing up the facing strips, I used hide glue.

Hardware

There are just two things left to do to complete the parts bin. Add a lazy Susan bearing so you can spin it around. And attach label holders to see what's inside each compartment.

LAZY SUSAN. To provide a mounting platform for the lazy Susan, a circular plywood *base (J)* is screwed to the bottom of the frame, see Fig. 10. Then the bearing is screwed in place.

LABEL HOLDERS. Finally, label holders are tacked to the front of each compartment. But because you're going into hardwood, be sure to drill pilot holes first.



Belt Sanders

Seven belt sanders that perform as differently as they look. Which one is best for you?

Chicago Pneumatic HBSE-75S
800-243-0870
$189.95

Ryobi BE-321
800-525-2579
$136.99

Bosch 3270DVS
312-286-7330
$164.95

When you think about a belt sander, one thing that often comes to mind is a big, heavy tool that's hard to control. Or accidentally tipping the sander and gouging the workpiece.

But if the belt sanders we tested are any indication, things are changing. Even though they don't guarantee perfect results, they make it considerably easier to sand a panel flat or smooth a rough surface.

SELECTION. When selecting these belt sanders, the biggest question was size. We felt that a sander that uses a 3"-wide belt is a good, "all-around" tool. So we decided to test 3" belt sanders, see margin at left and on page 9.

TEAM. After buying the sanders, we rounded up our usual team of three woodworkers to test them: *Ken* (a professional), *Steve* (advanced), and *Cary* (a beginning woodworker).

Q: *Why do some of these sanders look more streamlined than others?*

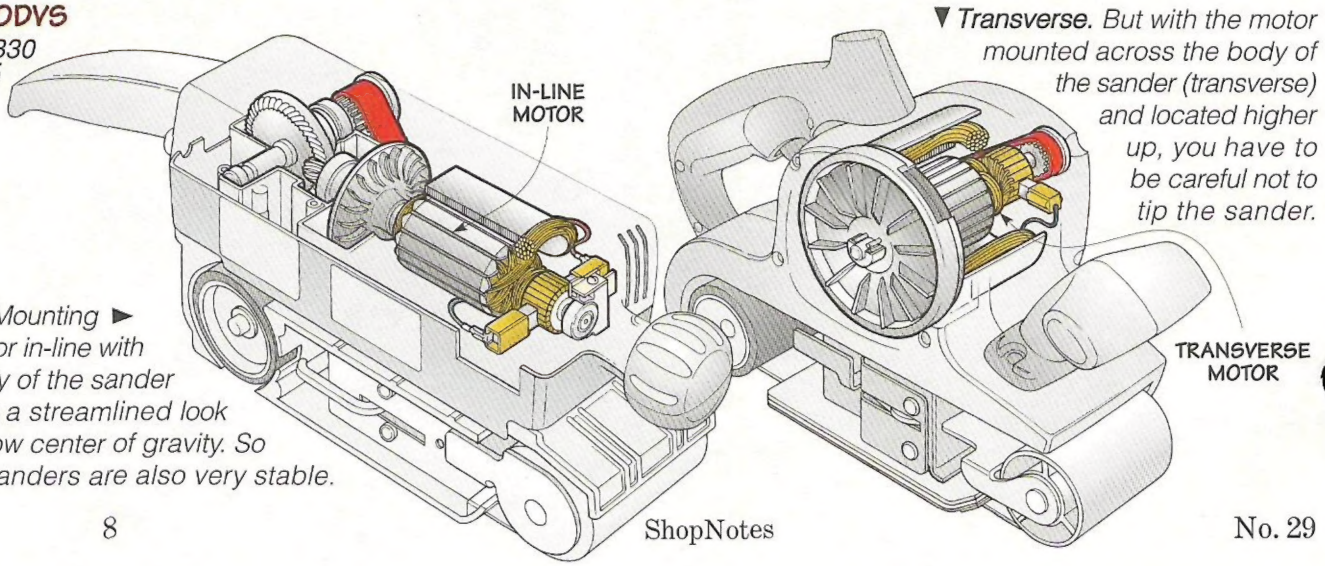
Ken: The shape depends on whether the motor is in *line* with the body of the sander or *across* (transverse) it. (See drawings below.)

With the in-line sanders (Chicago Pneumatic, Bosch, and Ryobi), the weight of the motor is down low. This gives me a good, stable feel as I'm sanding. But with the transverse sanders (Porter Cable, Makita, Hitachi, and DeWalt), the weight of the motor is located higher up. So I had to be a bit more careful to avoid tipping them as I was sanding.

Cary: One thing I liked about the in-line sanders is the flat top on the motor housing. That makes it easy to flip them upside down and sand small parts. (See photo A at center.) The Chicago Pneumatic even comes with its own supports that attach to the top. (See photo B.)

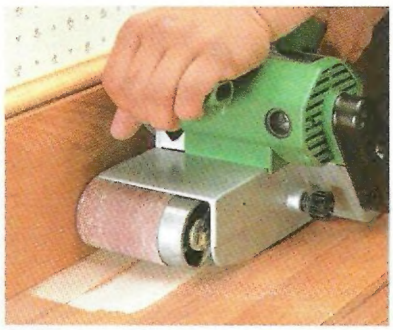
The transverse models aren't as convenient when it comes to converting them into a stationary sander. Something always gets in the way — a power cord, handle, or dust bag. I could buy a stand to mount on the bench to get around that. But it just adds to the cost of the sander.

Ken: Another thing about the in-line sanders is the plastic motor housing is flat on the *sides* too. So



▼ ***Transverse.*** *But with the motor mounted across the body of the sander (transverse) and located higher up, you have to be careful not to tip the sander.*

In-line. *Mounting the motor in-line with the body of the sander creates a streamlined look and a low center of gravity. So these sanders are also very stable.* ►



Flush Sanding. *Since the sides are flat on the in-line sanders, you can sand right up into a corner (left). Tracking the sanding belt to the edge of the platen accomplishes the same thing with the Hitachi (right).*

◀ **Graphite.** *The belt runs cooler and stays cleaner with a graphite platen.*

◀ **Metal.** *But a lot of heat builds up with a metal platen.*

if I'm sanding the edges around a floor, I can get right up next to the wall. (See photos above.)

At first I didn't think I'd be able to do that with the Makita and Hitachi. That's because the motor housing sticks out on the sides. But the platen that the sanding belt runs across is extra wide. So I just track the belt to the edge of the platen.

Q: *Were there any other differences in the platens on these sanders?*

Cary: The biggest one is that the platen on the Chicago Pneumatic is a piece of flexible, canvas-like cloth with bits of graphite embedded in it. Quite a bit different than the metal platens on the other belt sanders. (See photos above right.)

Ken: The graphite platen looks odd at first. But it makes sense. In fact, I'd say it was because of the platen that the sanding belts we used on the Chicago Pneumatic didn't clog up as fast as the belts on the other sanders.

What's happening is the platen works like a dry lubricant on the back of the sanding belt. Since the belt runs more smoothly (with less friction), not as much heat builds up. So pitch and resin don't bond to the belt like they normally would.

Weight	
Bosch	7lbs/6oz
Chicago Pneumatic	9lbs/5oz
DeWalt	8lbs/2oz
Hitachi	10lbs/8oz
Makita	11lbs/1oz
Porter Cable	11lbs/3oz
Ryobi	8lbs/9oz

Q: *Regardless of the platen, the sanding belt has to track accurately across the rollers. Any problems with belts working their way to one side or the other?*

Ken: All the sanders needed a bit of adjustment when I put on a new belt — but that's pretty typical. The thing that impressed me was how quickly I was able to adjust the tracking on the Ryobi, Hitachi, and DeWalt.

With the other sanders, I had to play with the adjustment knob a bit. Especially the Chicago Pneumatic — it has a "dead zone" where I turn the knob, but nothing happens.

Q: *What about the weight and feel of these sanders?*

Steve: As far as I'm concerned, heavy is better. (See chart.) I'm usually sanding a workpiece that's clamped down on the bench anyway. I might as well let the weight of the sander do the work — not my arms.

Cary: The location of the handles also affects the overall feel of the sanders. The handles on the DeWalt are so close together, it feels like I'm handcuffed. (See photos below.) With the handles farther apart, I get a more comfortable grip.

DeWalt 431
800-433-9258
$189.95

Hitachi SB-75
800-546-1666
$155.00

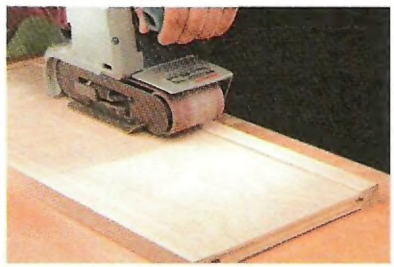
Makita 9900B
800-462-5482
$179.00

Porter Cable 352VS
800-487-8665
$155.99

Handles. *The handles on the DeWalt (left) are so close together, it's awkward to hold. But the handles are set farther apart on sanders like the Hitachi (center) and in-line models like the Bosch (right). This provides a much more comfortable grip and makes these sanders easier to control.*

Performance

Panels. *To test whether the motors would bog down on a tough job, we sanded glued-up panels flat.*



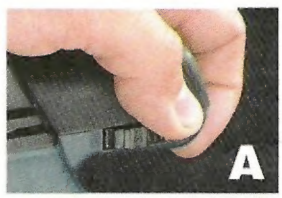
Edging. *Sanding wood edging flush with a plywood surface showed how much control the sanders provided.*

Curves. *And to see how easy it is to "freehand" these sanders, we shaped large, gentle curves.*

Q: *We've talked about the different parts of these sanders. Now let's talk about their performance. What exactly are you looking for here?*

Ken: Basically, we wanted to see if these sanders had enough power to handle the big jobs. Yet still provide the control that's needed for more precise work.

Since I use a belt sander mainly to flatten solid wood panels, I want one that won't bog down. That's why I liked the Hitachi. It has one of the biggest (highest amp) motors. (See chart on top of next page.) And it's the most aggressive sander of the bunch.



Steve: When it comes to removing stock in a hurry, I can get just as much sanding done with the Chicago Pneumatic. And even though the Ryobi, Makita, and Porter Cable don't run quite as strong, they're definitely better than the DeWalt and Bosch.

These two sanders have the smallest motors of all. On top of that, they have a fairly slow sanding speed. (See the chart on next page.) When you combine these two things, they just don't have the guts to do heavy-duty work. And sanding (which isn't my favorite job anyway) gets to be a real chore.

So to speed things up, I end up bearing down a little more. And that just about stalls the sander.

Cary: If the motors have enough power to begin with, I like the sanders with variable speed. Being able to slow down the sanding belt gives me a lot more control.

That comes in handy when I'm working with plywood and solid wood edging. If I'm sanding the edging flush, I don't have to worry as much about cutting through the thin veneer.

Q: *So which sanders have variable speed control?*

Steve: All of them except the Makita have some type of speed control. It's pretty basic on the

Sanding Frames

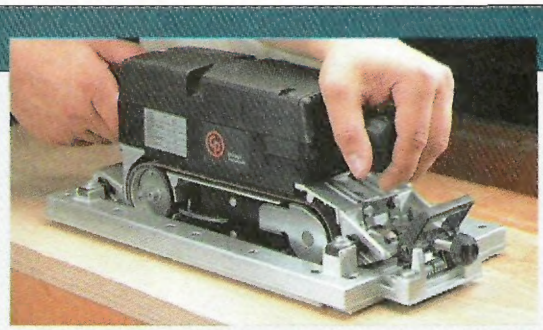
One way to avoid gouging a workpiece or creating a low spot is to use a sanding frame, see photo.

With the sander clipped into the frame like a ski boot, the sanding belt extends just below the frame. This way, as the frame slides across the workpiece, the sanding belt removes only the high spots and levels the surface.

PHENOLIC. The frames on the DeWalt and Ryobi have a phenolic base, see bottom left photo. This makes them slide smoothly. But they occasionally "catch" on the edge of the workpiece.

BRISTLES. That's not a problem with the Chicago Pneumatic and Bosch. These frames have bristles like a toothbrush that slide over the edge, see bottom right photo.

COST. The frames range in price from $49.25 for the Ryobi to $99.95 for the Chicago Pneumatic. The DeWalt ($69.95) and Bosch ($79.95) fall in the middle. Note: No frames are available for the Makita, Hitachi, and Porter Cable.



Dust Collection. *The dust bag on the DeWalt (left) is small and out of the way. But it doesn't collect as much dust as the side-mounted bag on the Bosch (center) and the Porter Cable's rear-mounted bag (right).*

Hitachi. You just get two speeds — fast and faster. But on most of the sanders, I can dial in a range of speeds. (See the chart below.)

Cary: One of the easiest to adjust is the variable speed control on the Ryobi. That's because the dial that controls the speed is on the front handle right next to my thumb. (See photo A on opposite page.) So I can change the speed right while I'm sanding instead of having to stop and adjust it.

Steve: The Bosch is a little bit different. It has a *trigger* that controls the speed. (See photo B.) Squeezing the trigger increases the speed. And easing off slows the belt down. To limit the speed I get at "full trigger," I just dial in the right setting.

Ken: Changing the speed of the sanding belt isn't the only way to control a belt sander. The sanding frames we bought also worked well when it came to sanding a surface level. (See box on page 10.)

Q: *Belt sanders generate lots of dust. Did the dust bags pull it all in?*

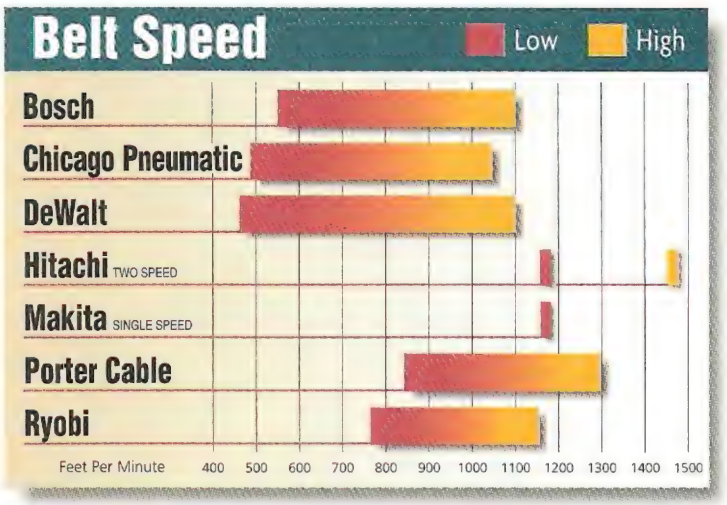
Cary: I didn't expect the bags to pick up *all* the dust. But they did a good job — especially the Chicago Pneumatic. There's a "scoop" above the back roller that picks up the dust right as it comes off the belt and directs it into the bag.

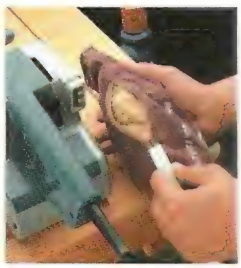
Steve: Before I started sanding, I liked the location of the dust bag on the DeWalt — up front and out of the way. (See photos above.) But there's a plastic support inside the bag that rubs against my hand. And that gets uncomfortable after just a few minutes.

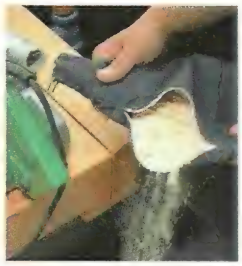
The side-mounted bags on the Bosch, Ryobi, and Chicago Pneumatic, and the rear-mounted bags on the Makita, Porter Cable, and Hitachi also get in the way to some extent. But that's something I can live with compared to filling the shop with clouds of dust.

Ken: I didn't think about the bags much until I emptied them. The Makita and Bosch have a slide-on clip. (See margin at right.) It comes off in a snap, but the bags bunch up when I slide the clip back on.

Cary: All the other bags have a zipper that's easier to use. But the DeWalt has a plastic support right under the zipper that makes it a pain to empty.







Dust Bags. *Sliding a clip on and off when emptying a dust bag (top) isn't as handy as a zipper (center). But the zipper on the DeWalt (bottom) has a plastic support below it that makes the bag hard to empty.*

Recommendations

Cary: What's the best belt sander? I picked the Ryobi because it gives me the most for my money.

This sander removes stock quickly. And with the variable speed control at my fingertip, I always have plenty of control.

Also, being able to mount it to the bench is a big plus for me.

Steve: I chose the Chicago Pneumatic. It's expensive. But I think it's worth it.

With its strong-running motor and good, solid feel, I'm able to work fast *and* comfortably. And no matter how much material I "hog" off, that dust collection system is sure to handle it.

Ken: The only reason I use a belt sander is to to remove stock fast. So I picked the sander that does that the best — the Hitachi.

I like the overall heft of this sander. It feels like a big, rugged tool. Yet it's easy to guide across the workpiece. And its two speeds are all I need for the work I do.

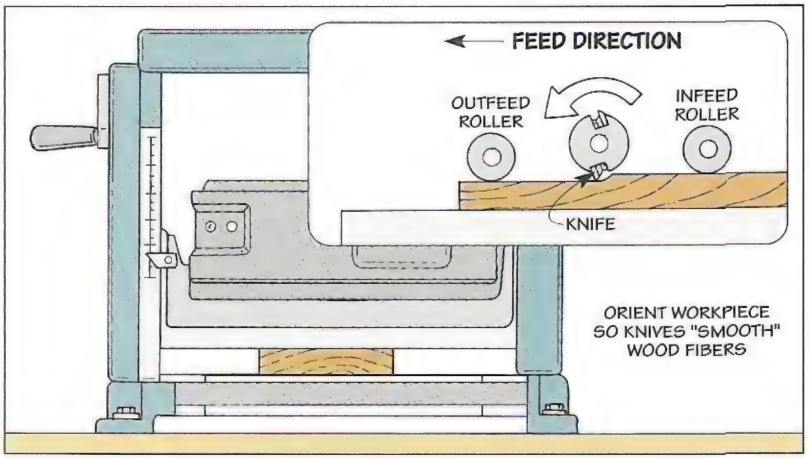
Planer Tips

Here's a collection of our best tips that will help you get the most from your thickness planer.

Grain Direction

■ Getting a smooth, chip-free surface with a thickness planer takes more than just a set of sharp knives. You also have to feed the workpiece through the planer so the knives cut *with* the grain, see drawing.

To do this, check the grain direction on the edge of the board. The idea is to pass the workpiece through the thickness planer so the knives "smooth" the wood fibers instead of tearing them out.



Planing an Edge

■ Even though a planer is used primarily for thicknessing stock, it can also be used to plane a smooth, square edge that's parallel to the opposite edge. This comes in handy when I have several workpieces that need to be trimmed to the same width.

To make this work, the edge that rides on the bed of the planer needs to be straight and square to the face of the workpiece. So start by jointing (or hand planing) this edge first.

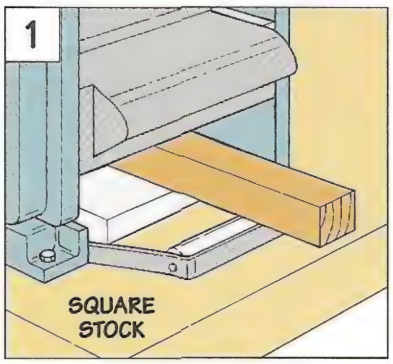
Now, depending on the size and number of workpieces, I use several different approaches.

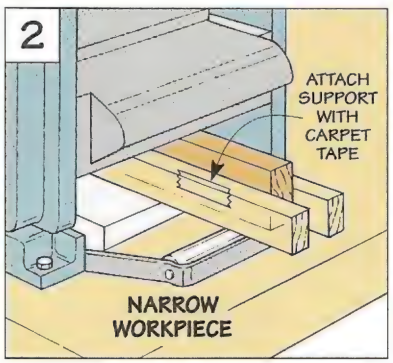
SQUARE STOCK. If the workpiece is thick (roughly square-shaped), planing an edge is like planing the surface of a board, see Fig. 1. The extra thickness provides a stable platform as you run the piece through the planer.

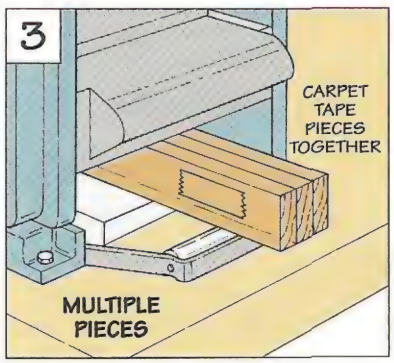
NARROW STOCK. But when the edge of a piece is narrow, there's not as much support. So the workpiece may tip over as it passes through the planer.

The solution is to carpet tape a support to each side of the workpiece, see Fig. 2. Just be sure that the supports are flush with the bottom of the workpiece.

MULTIPLE PIECES. If you're planing the edges on a number of pieces that are the same width (a set of stiles and rails for example), the workpieces act as their own supports. Simply gang them together with carpet tape to form an oversized blank, see Fig. 3.



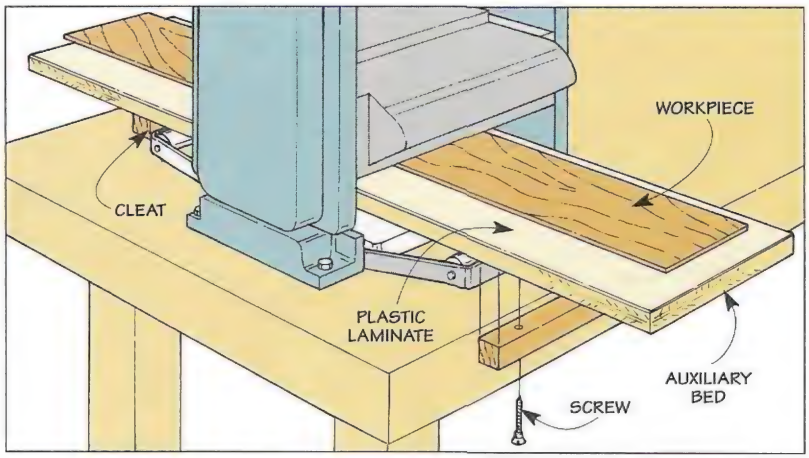




Thin Stock

■ Most planers are designed to reduce stock to a thickness of an 1/8". To plane thinner stock, I "raise" the bed of the planer with an auxiliary bed, see drawing.

This bed is just a piece of 3/4"-thick plywood covered with plastic laminate. A pair of cleats screwed to the bottom of the platform keep it from being pulled through the planer. Note: This auxiliary bed isn't intended to be used with planers that have feed rollers on the bottom.



Short Pieces

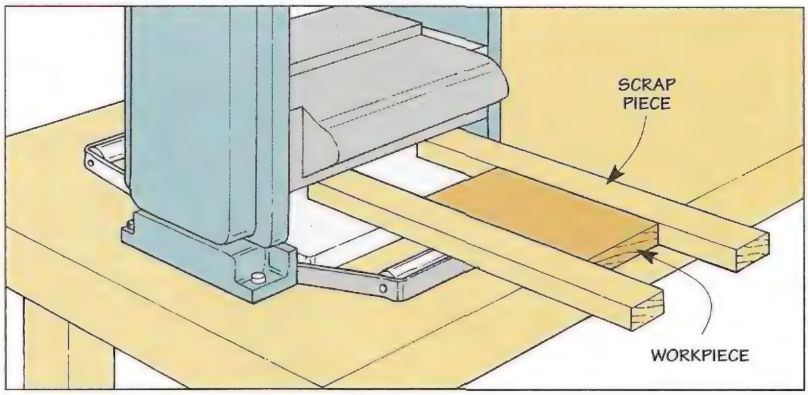
■ When planing a workpiece, you often end up with a dished cut (snipe) at one or both ends. That's because when only one feed roller is applying pressure to the workpiece (at the beginning and end of a cut), the end tips up into the knives.

That's okay on a *long* workpiece. Just start with a board that's longer than needed and cut off the dished ends. But with a *short* piece, the usable length of the board may not be long enough for what you need.

Fortunately, there's an easy fix. Just use hot melt glue to attach long scraps to the workpiece, see drawing.

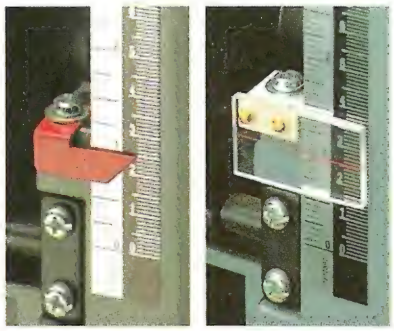
This way, the feed rollers apply pressure on the workpiece before *and* after it passes under the cutterhead. And if there's any snipe, it's on the ends of the scraps — not your workpiece.

Once the workpiece is planed, simply remove the scrap pieces and scrape off any glue.



Quick Tips

Chalk. *Scribbling a chalk mark on a board and planing until it disappears ensures that the entire surface is flat.*



Indicator. *To make the scale easy to read, replace a pointer (left) with a hairline indicator made of wood and Plexiglas (right).*

Moisture Balance

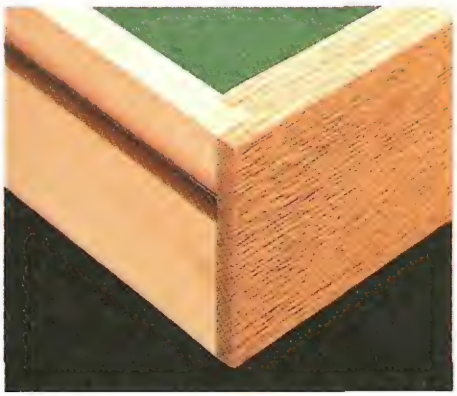
Sometimes a board will cup or warp after it's planed. That's because the newly exposed wood is readjusting to the level of moisture in the shop.

One way to keep boards as flat as possible, is to remove an equal amount of material from each side.

When removing a lot of material, plane the board to partial thickness and let it "rest" a day or two. Then if it moves, you can joint a flat surface before planing it to final thickness.

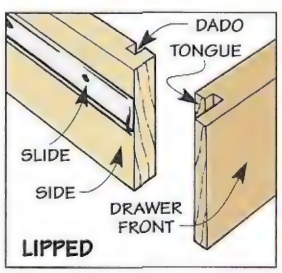
Locking Rabbet Joints

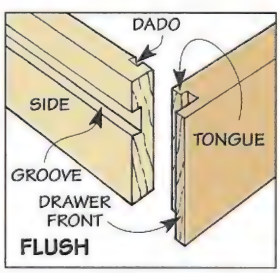
A. Lipped Joint. To hide the metal slide, this locking rabbet has a lip on the drawer front that extends past the side.



B. Flush Joint. Grooves in the sides of the drawer recess the guides that it runs on. So the front is flush with the side.

A strong, simple joint. That's what we wanted when building the drawers for the rolling tool cabinet. And that's why we decided to use locking rabbet joints.



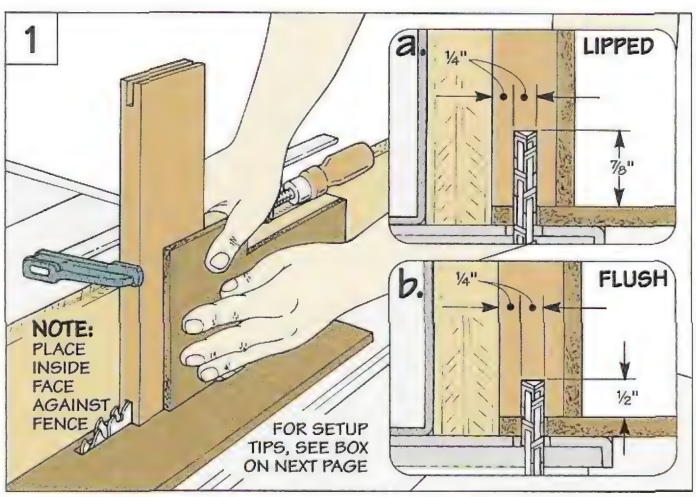


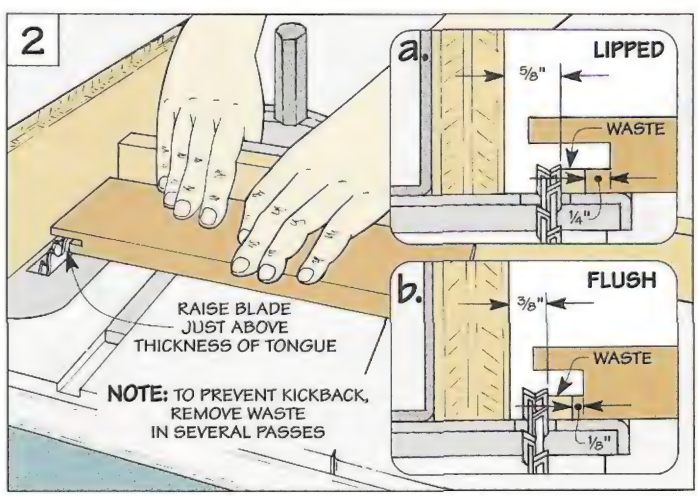
Depending on the type of guide system that supports the drawers, we used two different types of locking rabbet joints: lipped and flush.

LIPPED. The large drawers on the rolling part of the cabinet use a lipped joint, see photo A. That's because they ride on full-extension drawer slides that mount on the *surface* of the sides and cabinet. To cover the slides, there's a lip on the drawer front that sticks out past the side.

FLUSH. With the small drawers in the tool chest, you don't have to worry about hiding anything. That's because the guides that support them are *recessed* into the sides of the cabinet and the drawers. So the drawer front is flush with the sides, see photo B.

TONGUE & DADO. Regardless of the type of locking rabbet, the idea is the same. There's a *tongue* on the drawer front that fits in a *dado* in the side, see drawings.





Note: Both parts are cut with a ¼"-wide dado blade.

TONGUE. To form the tongue, the first step is to cut a groove in the end of the drawer front, see Fig. 1. This requires standing the piece on end. To do this safely, I use a simple setup, see box below.

When cutting the groove, the goal is to end up with a ¼"-thick tongue. This way, you won't have to adjust the width of the blade when you cut the dado later. So start by positioning the fence ¼" from the inside of the blade.

Then raise the blade to the correct height (for either a lipped or flush joint) and cut the groove, see Figs. 1a and 1b. Note: Place the *inside* of the drawer front against the fence.

The second part of making the tongue is to cut it to length, see Fig. 2. This is just a matter of using the fence as a stop to establish the final length of the tongue, see Figs. 2a and 2b.

When cutting the tongue, there's one thing to be aware of. If you remove the waste in a single pass, the cutoff can get pinched between the blade and the fence and come flying back. To prevent this, I make several passes until the workpiece "bottoms out" against the fence.

DADO. When you're done with the tongue, the next step is to cut the dado in the side of the drawer.

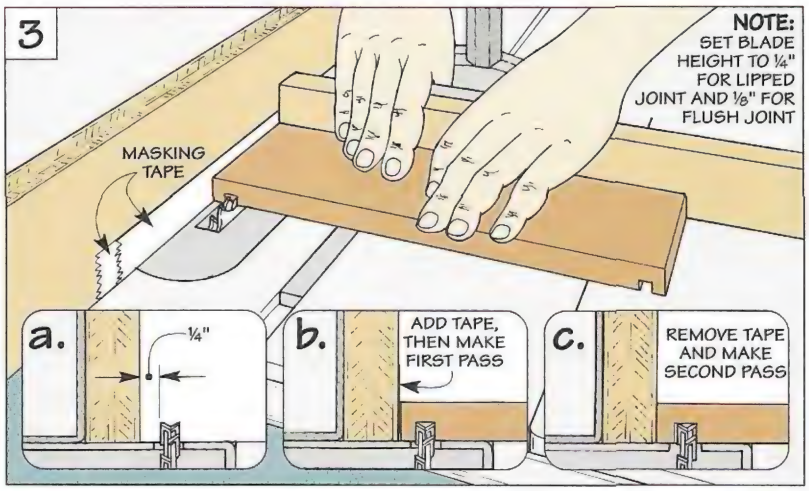
You're after two things here. The tongue on the drawer front needs to fit the dado in the side. And the narrow stub (the part that's left on the end after you cut the dado) has to slip into the groove in the drawer front.

In theory, this should be easy. Just adjust the blade height and set the fence. But in practice, I've found this can produce such a tight fit that the stub breaks off.

To prevent this, I use a simple two-pass method. The goal is to make the dado a hair *wider* and the stub just a bit *narrower*.

Start by setting the fence and blade height "by the numbers," see Figs. 3 and 3a. But don't cut the dado just yet. Instead, add a couple of strips of masking tape to the fence, see Fig. 3. (You may need to experiment with the number of layers).

This nudges the workpiece *away* from the fence when you make the first pass, see Fig. 3b. Removing the tape and making a second pass produces a perfect fit, see Fig. 3c.



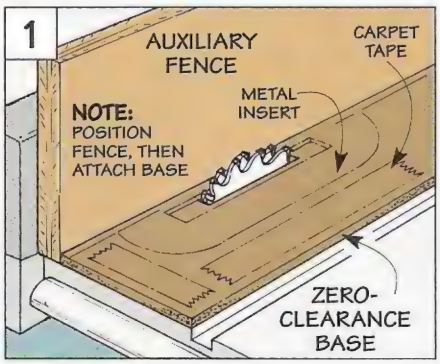
Setup & Safety Tips

Standing a workpiece on end to make a cut on the table saw can be a challenge.

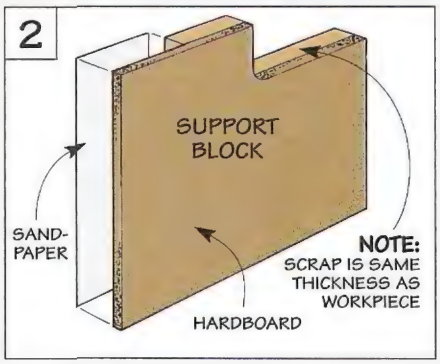
FENCE. To provide extra support for long workpieces, the first thing I do is attach a tall auxiliary fence (plywood) to the rip fence, see Fig. 1.

ZERO-CLEARANCE BASE. Also, a zero-clearance base (hardboard) keeps the workpiece from dropping into the opening between the blade and the insert. To make the base, carpet-tape it to the saw table and raise the blade.

SUPPORT BLOCK. Finally, to hold the workpiece tight against the fence (and avoid tipping it forward), I clamp it to a support block, see Fig. 2 above and Fig. 1 on page 14.



It's just a scrap with a piece of hardboard that extends out in front so you can apply pressue to the side of the workpiece. Cutting a notch in the block creates a clamping surface. And gluing on a strip of sandpaper keeps the workpiece from slipping.



Rolling Tool Cabinet

Roll this traditional-looking cabinet up next to your bench, and put all your tools in easy reach.

I suppose I could have bought a rolling tool cabinet. The kind with big banks of drawers and lots of storage underneath that auto mechanics use. But something just didn't seem right about storing my woodworking tools in a metal cabinet.

What I really wanted was a tool cabinet that was made from wood — one with a traditional appearance that I could roll right up to the bench while I'm working. So I decided to build a rolling tool cabinet of my own, see photo above.

It's designed with two separate storage units: a large base cabinet that rolls on casters, and a small tool chest that sits on top.

ROLLING TOOL CABINET. To provide storage for large hand tools and materials of different sizes, the rolling tool cabinet has a set of three progressively deeper drawers, see photo A. When you open the doors below, there's storage for portable power tools as well, see photo B.

CRAFTSMAN TOOL CHEST. But small hand tools can get knocked around or "lost" in these big storage areas. So to protect and organize precision hand tools, they're stored in a bank of shallow drawers in the craftsman tool chest, see photo C. (For more information on building just the tool chest, refer to the article on page 23.)

WOOD & FINISH. To produce a consistent look between the rolling tool cabinet and the tool chest (and to keep wood movement to a minimum), I used quartersawn red oak and riftsawn (straight-grained) oak plywood.

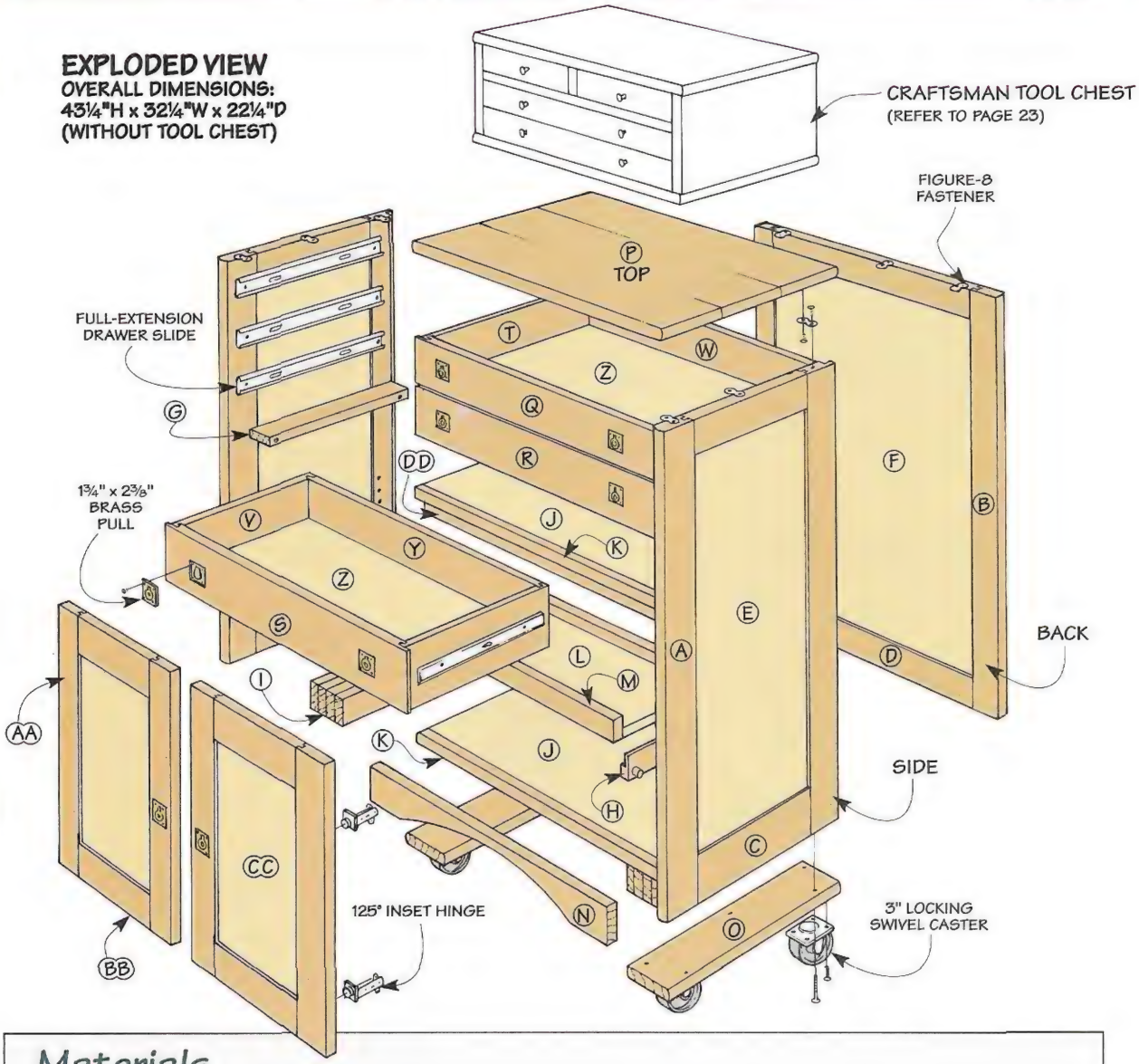
Finally, coloring a special finish contributes to an old-time look. (For more information on coloring a finish, see page 31.)

*A. **Drawers.** To provide easy access, the three drawers in the rolling cabinet are mounted on full-extension slides.*

*B. **Shelf & Tray.** Portable power tools are stored underneath on a large bottom shelf and a sliding tray.*

*C. **Tool Chest.** Felt-lined drawers in the craftsman tool chest provide a special place for your precision hand tools.*

EXPLODED VIEW
OVERALL DIMENSIONS:
43¼"H x 32¼"W x 22¼"D
(WITHOUT TOOL CHEST)



Materials

Case

A Side Stiles (4)	¾ x 3½ - 38
B Back Stiles (2)	¾ x 3½ - 38
C Side Rails (4)	¾ x 3½ - 15 ½
D Back Rails (2)	¾ x 3½ - 24¾
E Side Panels (2)	15½ x 31½ - ¼ Ply.
F Back Panel (1)	24¾ x 31½ - ¼ Ply.
G Fixed Cleats (2)	¾ x 2 - 19½
H Adjustable Cleats (2)	¾ x 1½ - 20
I Corner Blocks (8 pieces)	¾ x 2¾ - 20⅛
J Divider/Bottom Shelf (2)	20 x 30¼ - ¾ Ply.
K Trim Pieces (2)	¾ x 1 - 30¼
L Sliding Tray (1)	10½ x 29¾ - ¾ Ply.
M Lip (2)	¾ x 1½ - 29¾
N Apron (1)	¾ x 2¾ - 30¼
O Base Pieces (2)	¾ x 4¾ - 22¼
P Top (1)	¾ x 22¼ - 32¼

Drawers

Q Top Drawer Front (1)	¾ x 3½ - 30
R Middle Drawer Front (1)	¾ x 4⅜ - 30
S Deep Drawer Front (1)	¾ x 5¼ - 30
T Top Drawer Sides (2)	½ x 3½ - 20½
U Middle Drawer Sides (2)	½ x 4⅜ - 20½
V Deep Drawer Sides (2)	½ x 5¼ - 20½
W Top Drawer Back (1)	½ x 3½ - 28¾
X Middle Drawer Back (1)	½ x 4⅜ - 28¾
Y Deep Drawer Back (1)	½ x 5¼ - 28¾
Z Drawer Bottoms (3)	28¾ x 20 - ¼ Ply.

Doors

AA Door Stiles (4)	¾ x 3½ - 19⅞
BB Door Rails (4)	¾ x 3½ - 8½
CC Door Panels (2)	8½ x 13⅜ - ¼ Ply.
DD Door Stop (1)	¾ x ¾ - 30¼

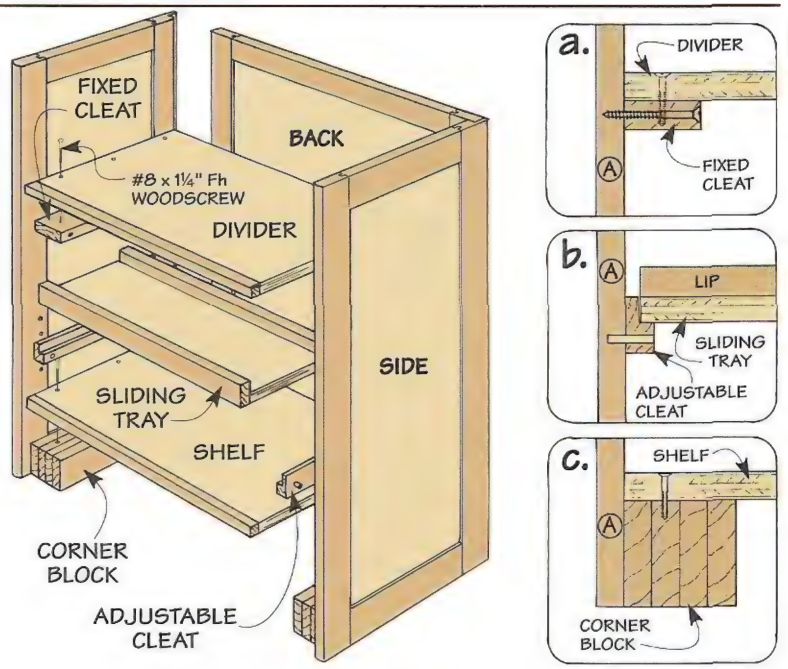
Hardware

- (3 pairs) 20" Full-Ext. Drawer Slides
- (2 pairs) 125° Inset Hinges
- (8) 1¾" x 2⅜" Brass Pulls
- (4) 3" Locking Swivel Casters
- (16) ¼" x 1" Lag Screws
- (16) ¼" Flat Washers
- (4) #8 x 2½" Fh Woodscrews
- (22) #8 x 1¼" Fh Woodscrews
- (9) Figure-8 Fasteners
- (18) #8 x ⅝" Fh Woodscrews

For a complete hardware kit, call ShopNotes Project Supplies at 800-347-5105.

Kit No. 6829-200.....$199.95

Case



I started on the rolling tool cabinet by making the case. Basically, it's a large open box that's divided into separate storage compartments, see drawing.

SIDES & BACK. To add rigidity to the case, the sides and back are made of solid wood frames and plywood panels. Each frame and panel is held together with simple (yet strong) stub tenon and groove joints.

The pieces of these frames are identical in width (3½"). And so is the length of the *side (A)* and *back stiles (B)*, see Fig. 1. But since the sides are narrower than the back, the *side rails (C)* are shorter than the *back rails (D)*.

To accept the plywood panels and rails, there's a groove cut in each piece, see Fig. 1a. And stub tenons are cut on the ends of each rail to fit the grooves, see Fig. 1b.

PANELS. With the joinery complete, you can add the *side (E)* and *back panels (F)*. These are just ¼"-thick pieces of plywood that are glued into the frames.

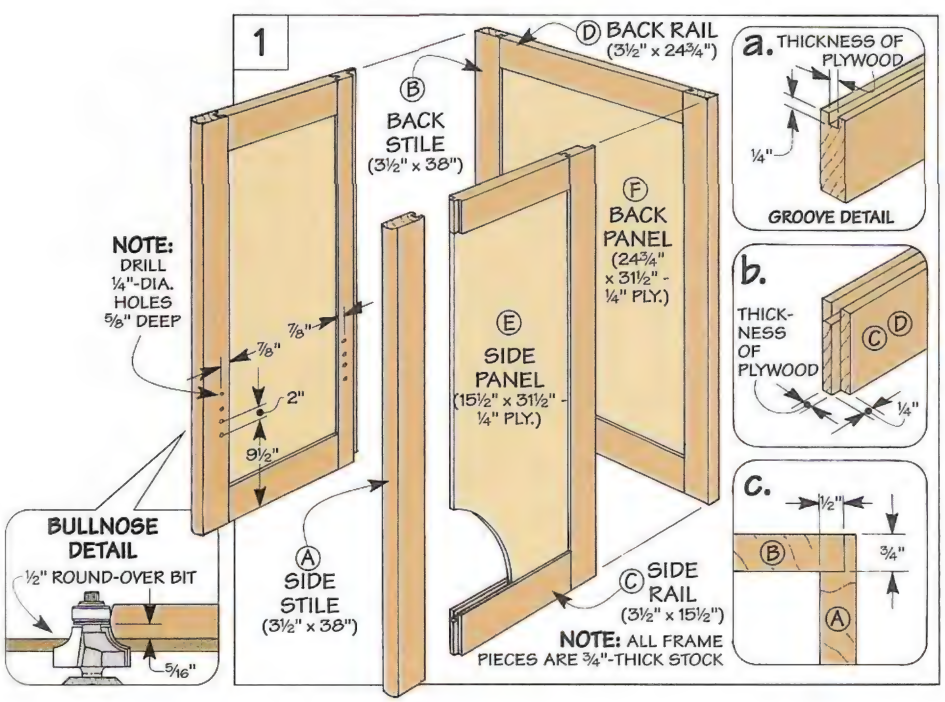
At this point, there's still some work left to do on the sides. To make the sliding tray (added later) adjustable, I drilled a series of holes in the side stiles (A), see Fig. 1. And there's a rabbet that's routed in the back edge of each side to accept the back, see Fig. 1c.

BULLNOSE. To soften the front edges of the sides, I routed a bullnose. But rather than buy a special bit, I used a ½" round-over bit instead and made a pass on each side, see detail in Fig. 1. This leaves a slight "flat," but all it takes is a little sanding to smooth it out.

SUPPORTS

Before assembling the case, it's easiest to add supports for a divider, sliding tray, and shelf.

FIXED CLEATS. The divider is supported by a pair of *fixed cleats (G)* made from ¾"-thick hardwood, see Fig. 2. After posi-



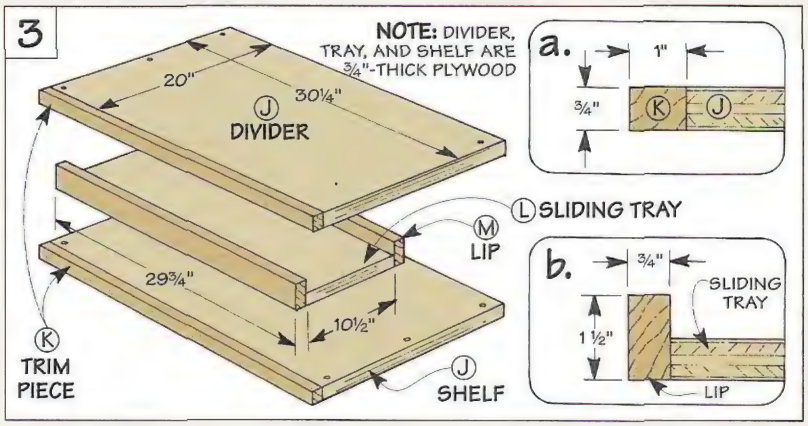
tioning each cleat flush with the inside edge of the rabbet, they're simply screwed to the side stiles.

ADJUSTABLE CLEATS. The sliding tray is also supported by two cleats. But to move the tray up or down, these *adjustable cleats (H)* have pins (dowels) that fit into the holes drilled earlier in the sides, see Fig. 2a.

To hold the cleats tight against the sides of the case, the tray sits in a rabbet cut in the edge of the cleats, see Fig. 2a. This way, the edge of the tray presses against the cleats and holds them in place.

CORNER BLOCKS. One last set of supports is a pair of corner blocks. Besides supporting the bottom shelf, these corner blocks direct the weight of the tool cabinet onto the casters, see margin.

To help carry this weight, the *corner blocks (I)* are made by gluing up four pieces of ¾"-thick stock, see Fig. 2. These blocks are simply glued flush with the bottom of each side.



DIVIDER, TRAY, & SHELF

With all the supports in place, you can turn your attention to the divider, tray, and shelf.

DIVIDER. The divider separates the cabinet into an upper and lower compartment. The top compartment houses three drawers. And the lower one provides storage underneath.

The *divider (J)* is just a piece of ¾"-thick plywood with holes drilled in it to attach it to the fixed cleats, see Fig. 3. Gluing on a hardwood *trim piece (K)* covers the front edge of the divider, see Fig. 3a.

SLIDING TRAY. To provide easy access to tools, the *sliding tray (L)* is a narrow piece of ¾"-thick plywood that pulls to the front of the cabinet. A hardwood *lip (M)* glued to the front and back edges keeps tools from falling off, see Fig. 3a.

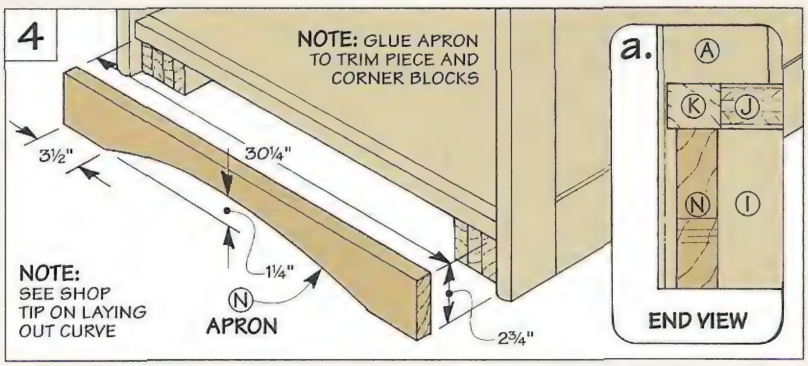
SHELF. For storage at the bottom of the case, there's a *shelf (J)* that's identical in size to the divider. Again, a *trim piece (K)* creates a finished looking edge.

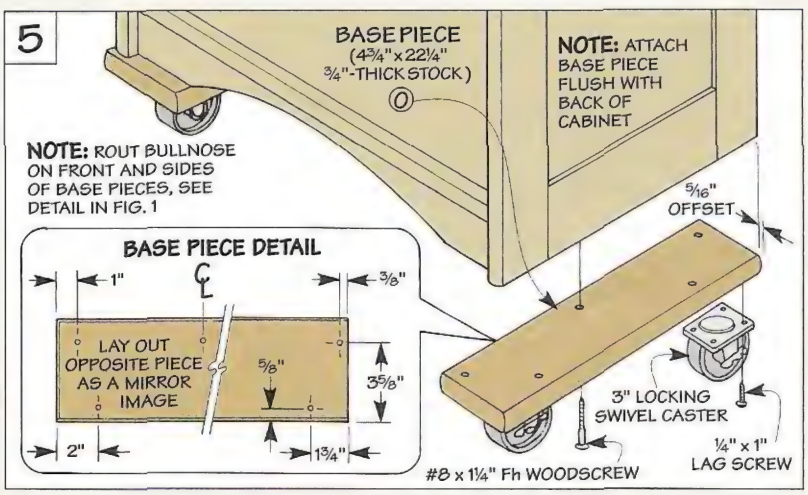
ASSEMBLY. At this point, you can glue up the case. To keep things square, I slipped the divider and shelf into the case. When the glue dries, just screw them in place and install the sliding tray.

APRON. Next, I added a hardwood *apron (N)*, see Fig. 4. After cutting a gentle curve on the bottom edge, this apron is glued to the trim piece (K) and corner blocks (I), see margin and Fig. 4a.

CASTERS. All that's left is to add four locking swivel casters. To provide a sturdy mounting platform for the casters, two *base pieces (O)* are attached to the bottom of the case, see Fig. 5. After routing a bullnose on the sides and front of the base pieces, they're screwed to the corner blocks and sides. Then just attach the casters with screws.

A thick corner block directs the weight of the cabinet and tools onto the casters.





Shop Tip

To lay out a large curve, bend a thin strip of hardboard in an arc. Then have a helper mark the curve on the workpiece.

Top

With the case complete, I started on the top of the cabinet.

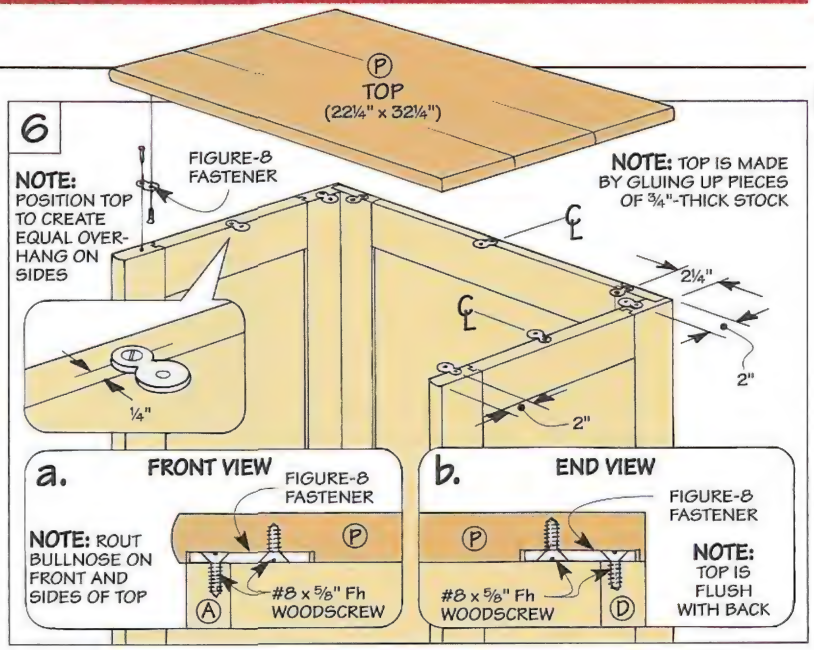
To provide a sturdy platform for the tool chest, the *top (P)* is a solid wood panel that's made by gluing up pieces of ¾"-thick hardwood (oak), see Fig. 6.

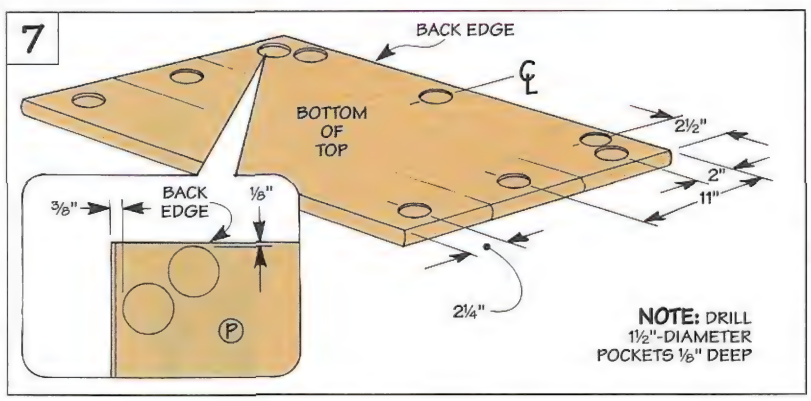
WOOD MOVEMENT. But a solid wood top creates an interesting problem when attaching it to the case. It has to be held tightly in place. But to keep the top from splitting, it still has to expand and contract with changes in humidity.

FIGURE-8. To secure the top *and* allow for wood movement, I used metal figure-8 fasteners. The small end of these fasteners attaches to the sides (or back) of the case, see details in Fig. 6. The large end fastens to the top. This way, when the wood expands or contracts, the fastener pivots and keeps the top from splitting.

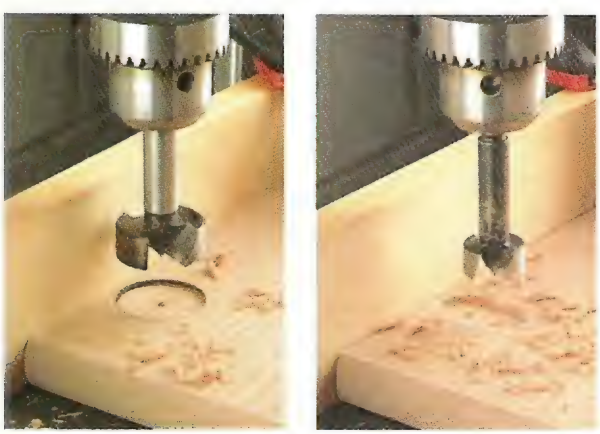
POCKETS. The figure-8 fasteners are recessed into shallow (⅛"-deep) "pockets." After laying out their location, I drilled the pockets with a 1½"-dia. Forstner bit, see Figs. 7 and 7a. But you can also drill overlapping holes with a smaller bit, see photos below.

Before attaching the top, there's one more thing to do. That's to rout a bullnose on the front and sides only. (The back edge is left square.)





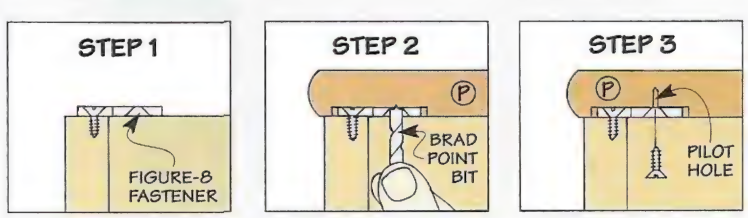
INSTALL FASTENERS. At this point, you're ready to install the fasteners. Installation is just a simple three-step process, see box below. Note: To provide easy access to the case when working on the drawers, it's best to wait until the drawer slides are installed to attach the top.



▲ ***Pockets.*** *To create crisp, clean pockets for the figure-8 fasteners, it's best to use a Forstner bit. This can be a large (1½"-dia.) bit (left). Or use a small (1"-dia.) bit and drill overlapping holes (right).*

Figure-8 Fasteners

To install a figure-8 fastener, start by screwing the small end of the fastener to the sides and back of the case, see Step 1. Then, after positioning the top and marking the location of the hole in the big end (Step 2), drill pilot holes in the top and screw the top in place, see Step 3. (Note: These fasteners are available from a variety of woodworking catalogs.)



Drawers

To provide storage for different sizes of tools and materials, I built three progressively deeper drawers for the upper part of the tool cabinet, see Fig. 8.

Strong locking rabbet joints hold the drawers together. And full-extension drawer slides provide easy access to what's inside.

There's nothing complicated about building the drawers. The drawer *fronts (Q, R, S)* are made from ¾"-thick hardwood (oak), see Fig. 8. And I used ½"-thick stock (maple) for the drawer *sides (T, U, V)* and *backs (W, X, Y)*. Note: These pieces are sized to allow ½" clearance for the drawer slides and an ⅛" gap all the way around each drawer front.

LOCKING RABBETS. With the pieces cut to size, you can concentrate on the locking rabbet joints. (See Figs. 8a and 8b and the article on page 14.) Then just cut grooves for the plywood *bottoms (Z)*, see Fig. 8c.

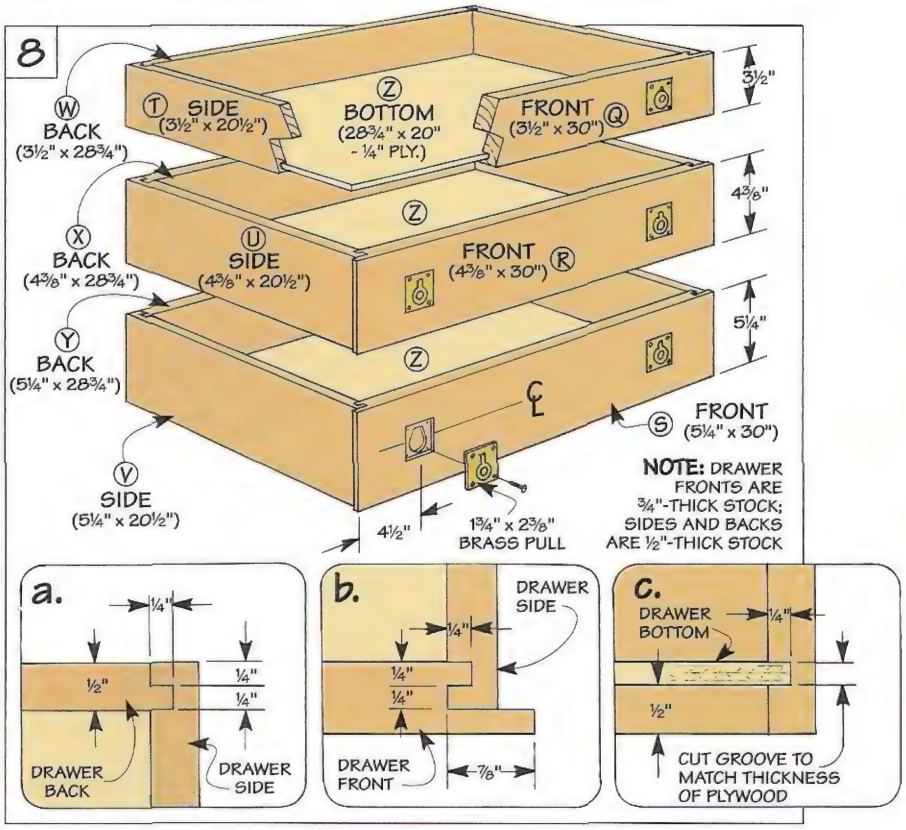
DRAWER PULLS. Before gluing up the drawers, it's easiest to install the brass pulls on the drawer fronts. (For a step-by-step procedure, refer to page 22.)

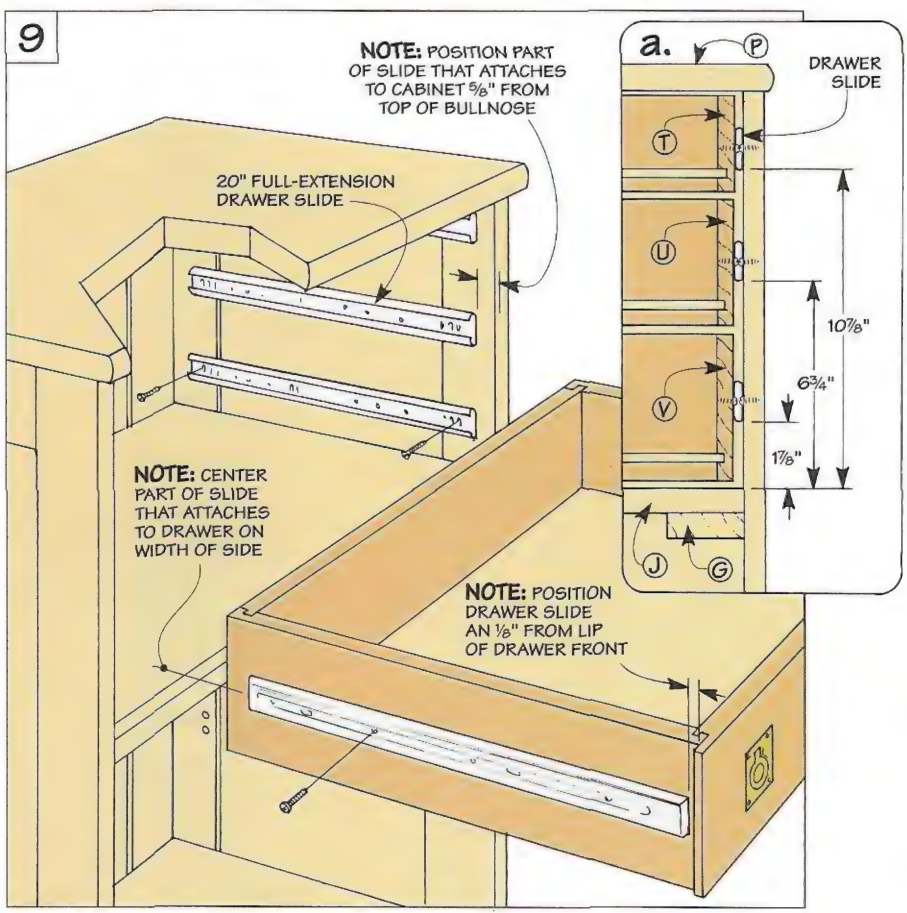
DRAWER SLIDES. Now it's just a matter of adding the drawer slides. These slides have two basic parts.

One is centered on the width of the drawer sides, see Fig. 9. It lets you adjust the drawer up and down, so you'll be able to "fine tune" the drawers for a consistent ⅛" gap all the way around.

The other part attaches to the side of the cabinet, see Figs. 9 and 9a. By adjusting this part, you can position the drawer fronts farther in or out of the cabinet. Note: Since I wanted to recess the drawer fronts about ⅛" back, I located the slide ⅝" in from the top of the bullnose.

ATTACH TOP. Now all that's left is to attach the top (see opposite page) and slide in the drawers.





Doors

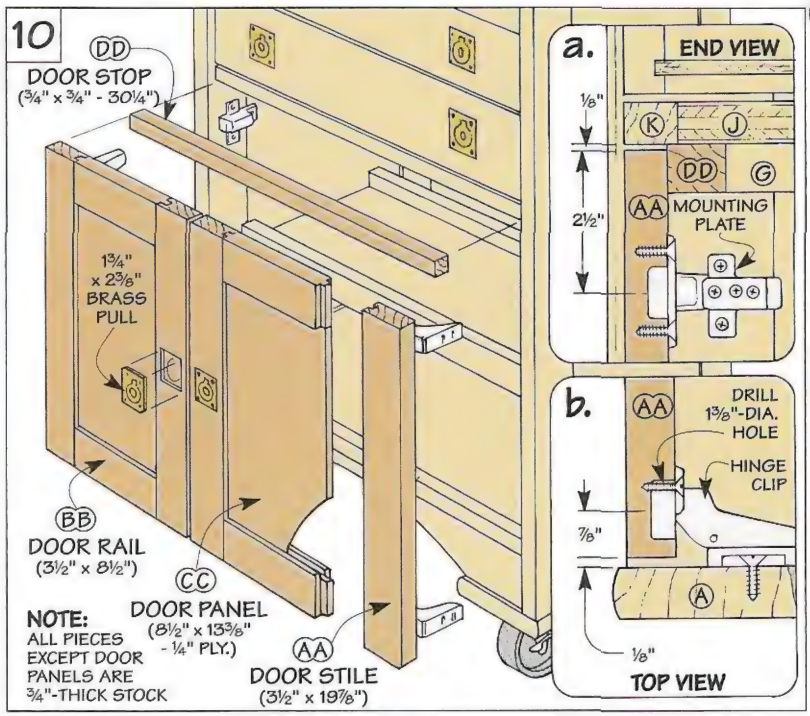
To keep dust and chips out of the lower part of the tool cabinet, I added two doors. Like the sides and back, the doors are simple wood frames and plywood panels that are held together with stub tenons and grooves.

APPEARANCE. In addition to the joinery, I also wanted to maintain a consistent *appearance* between the different parts of the cabinet.

So the *stiles (AA)* and *rails (BB)* are the same width ($3\frac{1}{2}$") as the stiles and rails on the sides and back, see Fig. 10. And to match the spacing of the drawers, these frame pieces are cut to length to allow an $\frac{1}{8}$" gap all the way around, see Figs. 10a and 10b.

Now you're ready to cut the stub tenon and groove joints, refer to Figs. 1a and 1b on page 18. Then, cut the *door panels (CC)* to size and glue up the doors.

Before installing the doors, I added a *stop (DD)* that keeps them flush with the front edge of the divider when they're closed.



This is a strip of hardwood that's glued under the divider, see Figs. 10 and 10a.

INSTALL DOORS. After adding brass pulls (see box below), you can install the doors. They're held in place with 125° European-style hinges, see Figs. 10a and 10b.

This requires drilling a $1\frac{3}{8}$"-dia. hole in the door stile to accept the hinge clip, see Fig. 10b. Then attach the mounting plate to the side, see Fig. 10a.

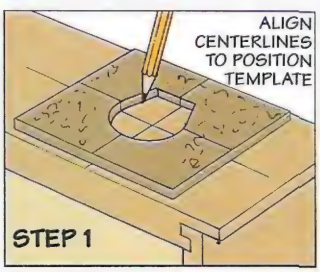
Installing Brass Pulls

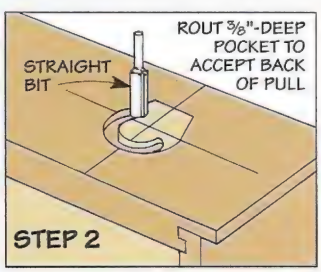
It's easy to install a brass pull flush with the surface of a door (or drawer). All it takes is to cut a two-tiered mortise — a deep, oblong-shaped pocket for the part that sticks out in back, and a shallow, rectangular recess for the mounting plate.

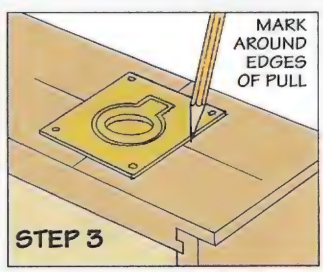
TEMPLATE. To lay out the deep pocket, I use a hardboard template with a horseshoe-shaped opening to match the back of the pull, see Step 1. To allow for some adjustment when positioning the mounting plate, the opening is $\frac{1}{16}$" larger than the back of the pull. Note: I draw centerlines on the template to make it easy to align.

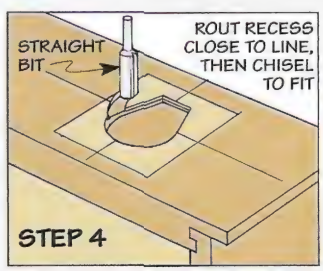
To form the deep pocket, it's easiest to use a straight bit and rout up to the line, see Step 2. Then, after setting the pull into the opening and marking around the mounting plate (Step 3), rout the shallow recess up close to (but not touching) the line (Step 4).

Now chisel up to the edges, checking the fit of the pull as you work.









Craftsman Tool Chest

Place this chest on top of the rolling tool cabinet. Or set it on a workbench. Either way, it protects and organizes your precision hand tools.

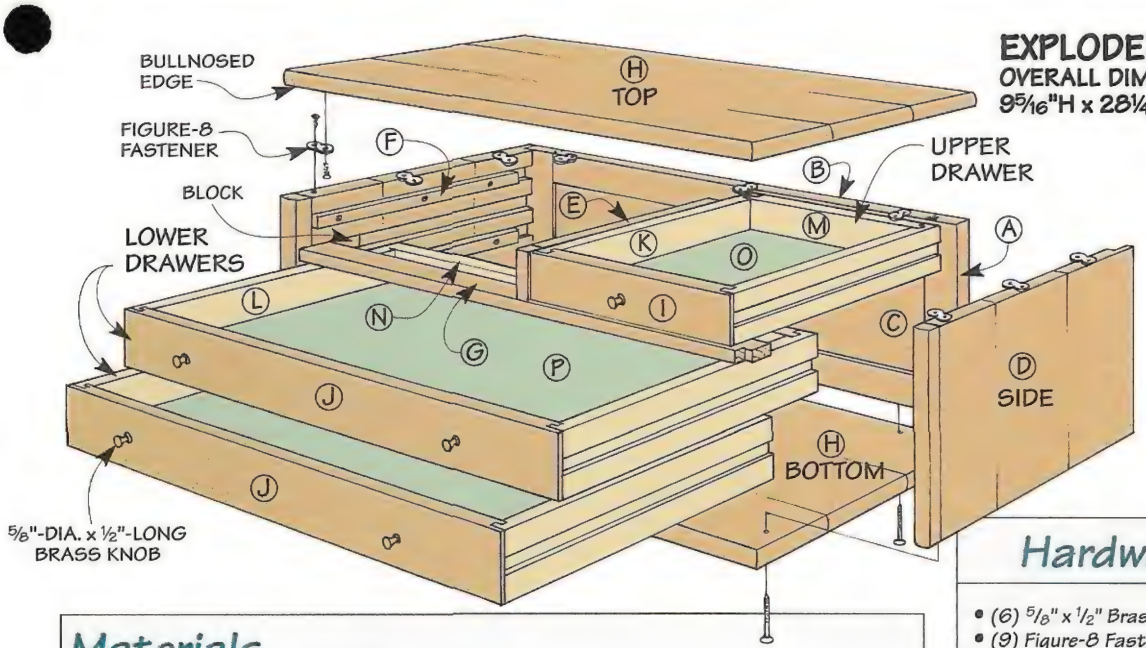
Special tools deserve a special place. At least, that's how I feel about my hand tools.

Whether it's the bevel gauge that belonged to my grandfather, a brand new precision square, or my best set of chisels, it's reassuring to know they won't get knocked around or damaged. And that they're within easy reach when I need to use them.

TOOL CHEST. That's why I built this craftsman tool chest, see photo. It protects and organizes my best hand tools. But what I like just as much is its traditional appearance — as comfortable as the look and feel of a tool that's polished with use.

SOLID WOOD. One thing that adds to this look is its solid wood panels made from quartersawn oak. Along with soft bullnosed edges, this makes the chest a perfect companion piece to place on top of the rolling tool cabinet. Or build it to stand by itself.

DRAWERS. Either way, a bank of four shallow drawers that run smoothly on wood guides provides plenty of storage and easy access to your tools. And lining these drawers with felt adds that final touch of craftsmanship.



EXPLODED VIEW

OVERALL DIMENSIONS:
9 5/16"H x 28 1/4"W x 16 1/4"D

Materials

Case			**Drawers**		
A	Back Stiles (2)	3/4 x 1 1/2 - 7 13/16	I	Upr. Drwr. Fronts (2)	3/4 x 1 3/4 - 12 3/4
B	Back Rails (2)	3/4 x 1 1/2 - 24 3/4	J	Lwr. Drwr. Fronts (2)	3/4 x 2 5/8 - 26 1/8
C	Back Panel	5 5/16 x 24 3/4 - 1/4 Ply.	K	Upr. Drwr. Sides (4)	1/2 x 1 3/4 - 14 1/2
D	Sides (2)	3/4 x 16 - 7 13/16	L	Lwr. Drwr. Sides (4)	1/2 x 2 5/8 - 14 1/2
E	Vertical Divider	1/2 x 14 - 1 7/8	M	Upr. Drwr. Backs (2)	1/2 x 1 3/4 - 12
F	Drawer Guides (8)	7/16 x 1/2 - 13 3/4	N	Lwr. Drwr. Backs (2)	1/2 x 2 5/8 - 25 3/8
G	Horizontal Divider	1/2 x 1 - 26 1/2	O	Upr. Drwr. Btms (2)	14 x 12 1/4 - 1/4 Hdbd.
H	Top/Bottom (2)	3/4 x 16 1/4 - 28 1/4	P	Lwr. Drwr. Btms (2)	14 x 25 5/8 - 1/4 Hdbd.

Hardware

- (6) 5/8" x 1/2" Brass Knobs
- (9) Figure-8 Fasteners
- (18) #8 x 5/8" Fh Woodscrews
- (1) #8 x 3" Fh Woodscrew
- (2) #8 x 2 1/2" Rh Woodscrews
- (9) #8 x 1 1/4" Fh Woodscrews
- (24) #6 x 5/8" Fh Woodscrews

Shopnotes Project Supplies is offering a complete hardware kit for the Craftsman Tool Chest. To order call 800-347-5105.

Kit No. 6829-300.....$14.95

Case

The case for the craftsman tool chest starts out simply enough — just two sides and a back that form an open, U-shaped frame, see Fig. 1.

BACK. Like the sides and back of the rolling tool cabinet, the back is just a wood frame that surrounds a plywood panel. The frame consists of two short *stiles (A)* and two long *rails (B)*, see Fig. 2. After cutting stub tenon and groove joints on these pieces (see page 18), a plywood *back panel (C)* is glued in the frame.

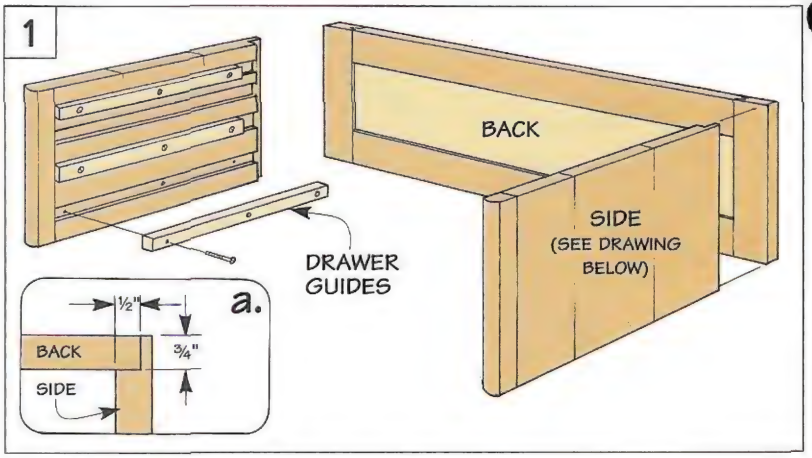
SIDES. With the back complete, the next step is to add the two sides, see drawing below. Besides enclosing the case, the sides support the wood guides for the drawers.

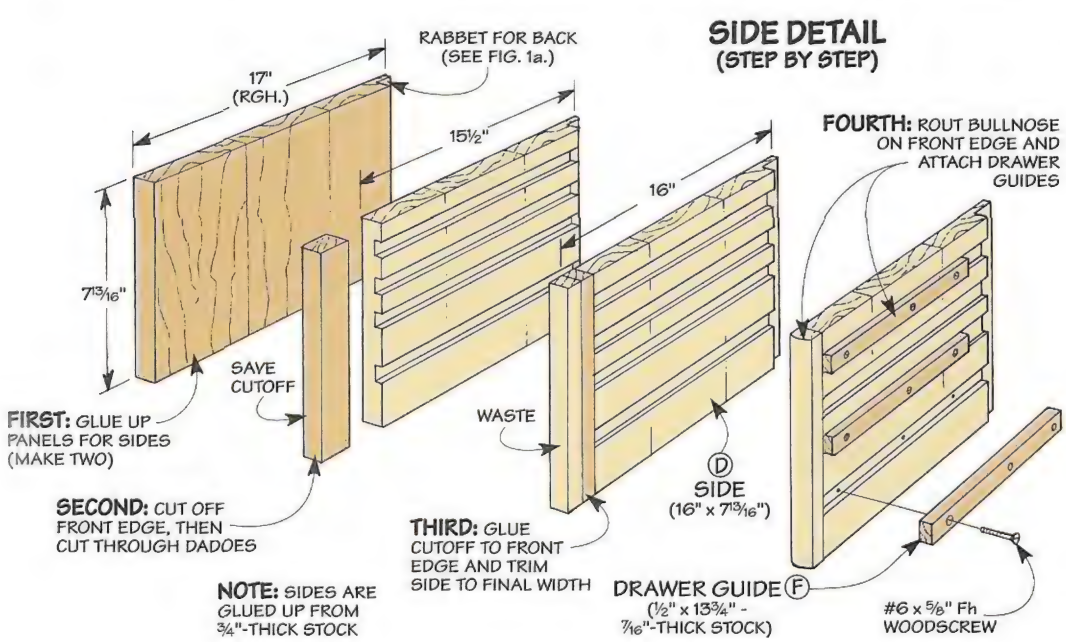
VERTICAL DIVIDER. In addition to the drawer guides on the sides, the vertical divider that separates the top two drawers also supports a pair of drawer guides, see drawing on page 25. So it's easiest to work on it at the same time as you make the sides.

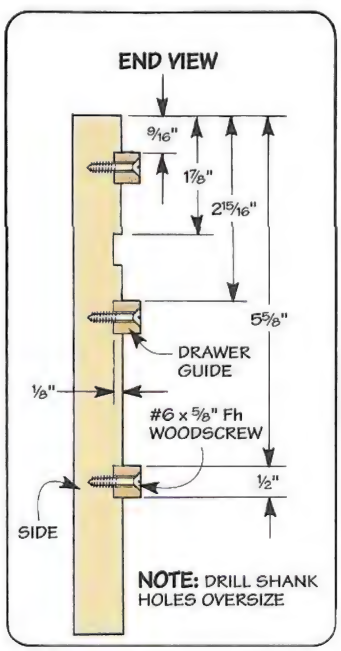
SOLID WOOD PANELS. Both the *sides (D)* and the *vertical divider (E)* are made by gluing up solid wood panels, see drawings below and on opposite page. (Note: The sides are made from ¾"-thick stock; the vertical divider is made from ½"-thick stock.)

The thing to be aware of is the grain direction of these panels runs *vertically*. This way, as the wood expands and contracts with changes in humidity, the panels will move *with* the top and bottom of the case — not against them.

When the glue dries, the







panels can be cut to final length (height). But to make it easier later when cutting stopped dadoes for the drawer guides, they're oversized in width.

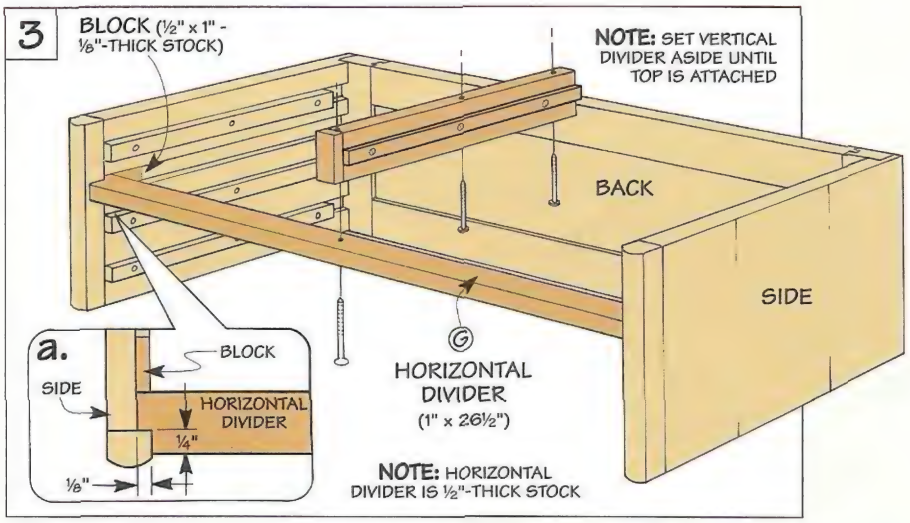
RABBET. Before cutting these dadoes, there's one more thing to do. That's to rabbet the back edge of each side (not the vertical divider) to accept the back of the chest, see Fig. 1a.

STOPPED DADOES. Now you can turn your attention to the stopped dadoes. One dado (the second one from the top on each side) accepts a horizontal divider that's added later. The others hold the drawer guides in place.

To keep the drawers from binding, it's important for these dadoes to align. At first, this sounds simple — just cut the dadoes in pairs using the same fence setting (and the same reference edge) on the table saw. But there's a problem.

After cutting one dado, the only way to cut the matching dado is to flip the side (or the vertical divider) end for end. This means you'd be cutting *through* the front edge of the panel. To get around this, I used a slightly unorthodox technique.

The basic idea is simple. To start with, cut the front edge off each panel (and save the cutoff).



This way, after cutting *through* dadoes, you can glue the cutoff back in place to form the *stopped* dadoes, see margin.

GLUE JOINT. You'd think this would create an obvious glue line. But because the grain of the panels is oriented up and down, you're gluing two pieces together with matching edge grain. This creates a glue joint that's nearly invisible.

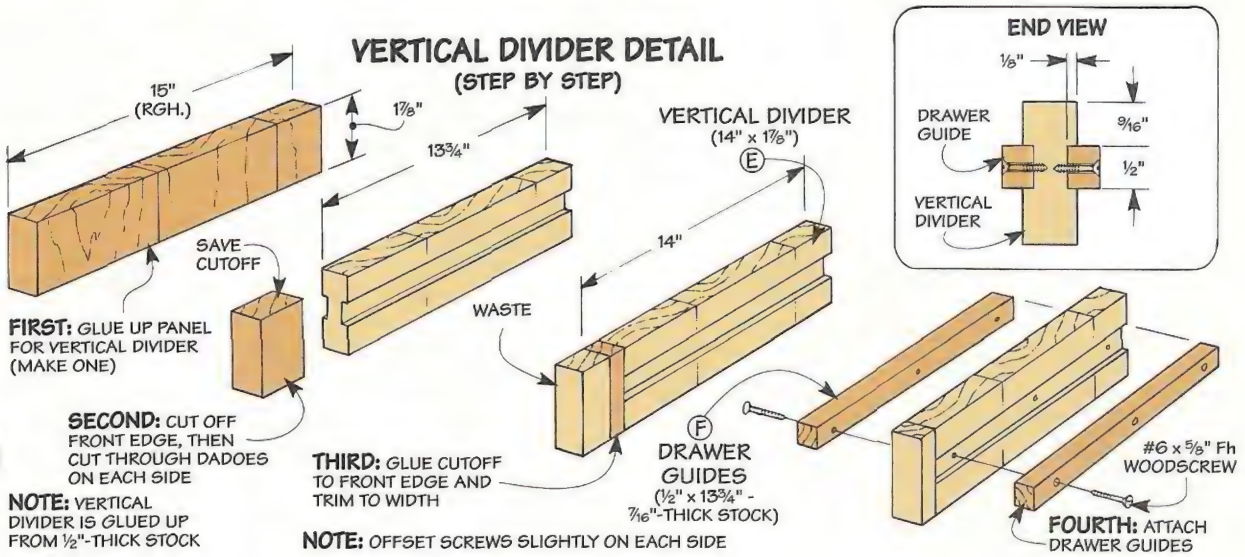
CUT TO WIDTH. After the glue dries, you can cut the *sides (D)* and *vertical divider (E)* to final width. To match the profile on the edges of the rolling tool cabinet, I routed a bullnose on the front edges of each side, refer to detail in Fig. 1 on page 18.

DRAWER GUIDES. Now it's just a matter of cutting the *drawer guides (F)* to fit the dadoes. These are strips of hardwood that are screwed (not glued) in place.

HORIZONTAL DIVIDER. With the guides in place, I added a *horizontal divider (G)* to separate the top and bottom drawers, see Fig. 3. It's a thin strip of hardwood with a notch at each end that fits in the open dado in the sides.

ASSEMBLY. All that's left is to assemble the case. This is just a matter of slipping in the horizontal divider, then gluing and clamping the sides and back. To hold the horizontal divider securely in place, I glued short blocks into the dadoes behind it, see Fig. 3.

Cutting stopped dadoes is easy. Just cut the front edge off the panel. Then cut a series of through dadoes, and glue the front edge back in place.



Top/Bottom

The case of the tool chest is sandwiched between two solid wood panels — one for the top and the other for the bottom.

Both the *top* and *bottom (H)* are made by gluing up pieces of ¾"-thick stock, see Fig. 4. The idea here is to orient the pieces so there's edge grain in front and back of the panels. This way, the top and bottom will move together with the sides (across their width) as they expand and contract with changes in humidity.

BULLNOSE. After gluing up the panels, there's one more thing to do. To match the look of the rolling tool cabinet, a bullnose is routed on the front and sides of each panel, refer to detail on page 18.

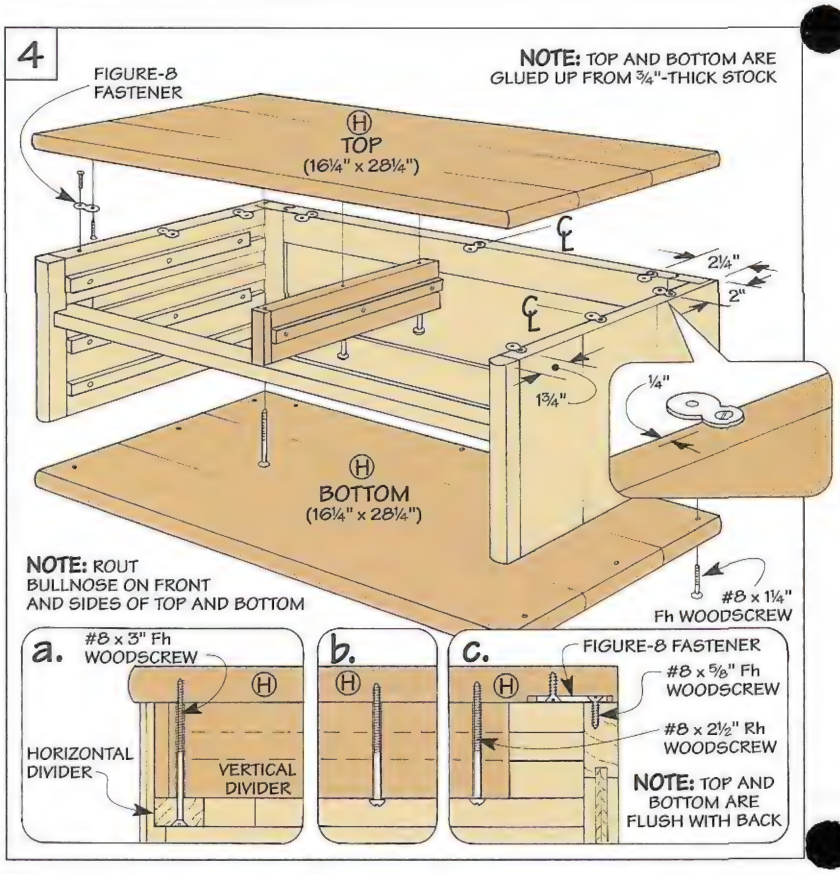
ATTACH TOP. Now you're ready to attach the top. Here again, I used figure-8 fasteners to hold it in place. Not because of wood movement. (Remember, the panels will all move together.) But because it's an easy way to attach the top without any hardware showing on the surface.

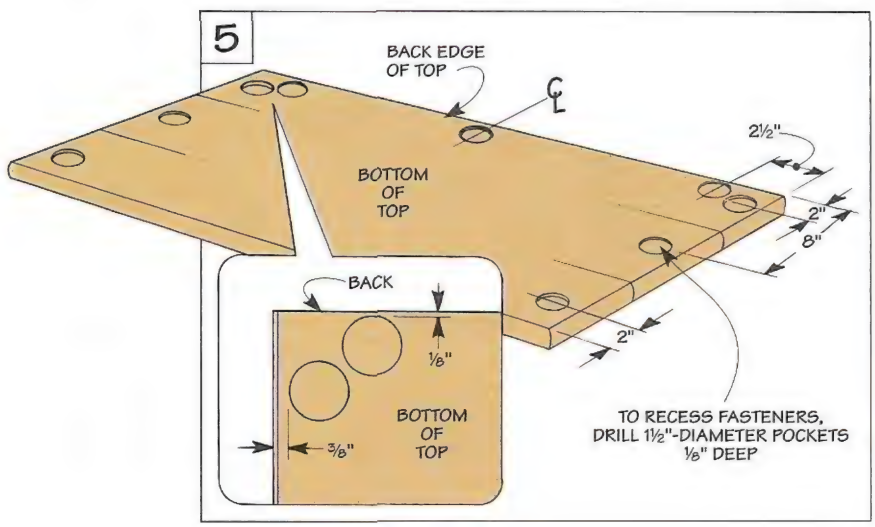
As before, the figure-8 fasteners are recessed by drilling a series of pockets in the top, see Fig. 5. And here again, the fasteners are screwed to the sides and back of the case, see Fig. 4.

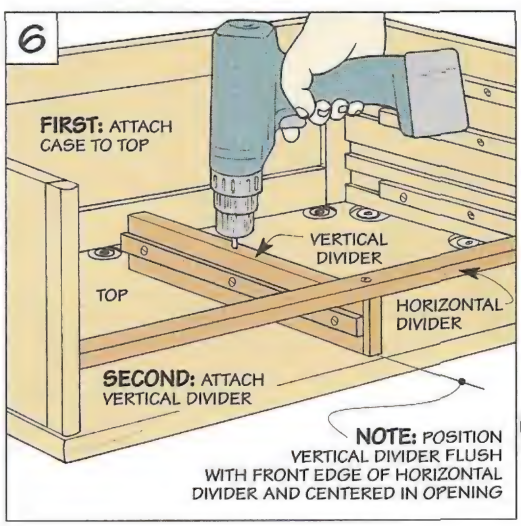
To attach the top, it's easiest to lay it upside down on a worksurface, see Fig. 6. Then, after positioning the case so the top extends an equal amount on each side (and it's flush at the back), simply screw it in place.

VERTICAL DIVIDER. At this point, you can attach the vertical divider to the top. It's held in place with three screws. A long flathead woodscrew passes through holes drilled through each divider and into the top, see Fig. 4a and 6. And shorter roundhead woodscrews are installed in the center and back, see Figs. 4b and 4c.

ATTACH BOTTOM. All that's left to complete the assembly is to screw the bottom to the sides and back of the case, see Fig. 4.







Drawers

To hold different size hand tools, this tool chest has two narrow drawers on top and two wide drawers at the bottom, see Fig. 7. They slide in and out of the tool chest on the wood drawer guides installed earlier.

LOCKING RABBET. Like the drawers on the rolling tool cabinet, they're held together with locking rabbet joints. But before cutting the joints, there are a couple of things worth mentioning.

First, the drawer pieces are sized to create a 1/16" gap all the way around, see Fig. 7a. And second, there's no lip on the front of the drawer. Instead, it's flush with the side of the drawer.

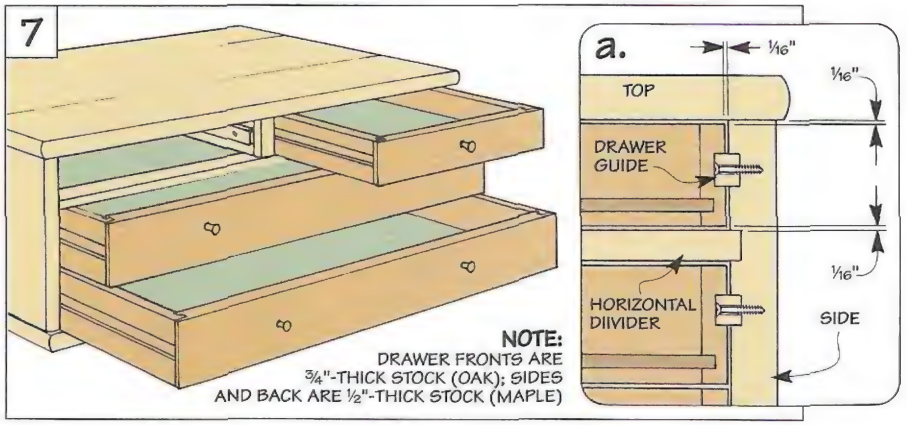
The reason for this is simple. When the drawers are installed, the wood guides are recessed into grooves in the *sides* of the drawers. So they're hidden by the drawer front. As a result, you don't need a lip to cover them like you do with the metal slides on the rolling tool cabinet.

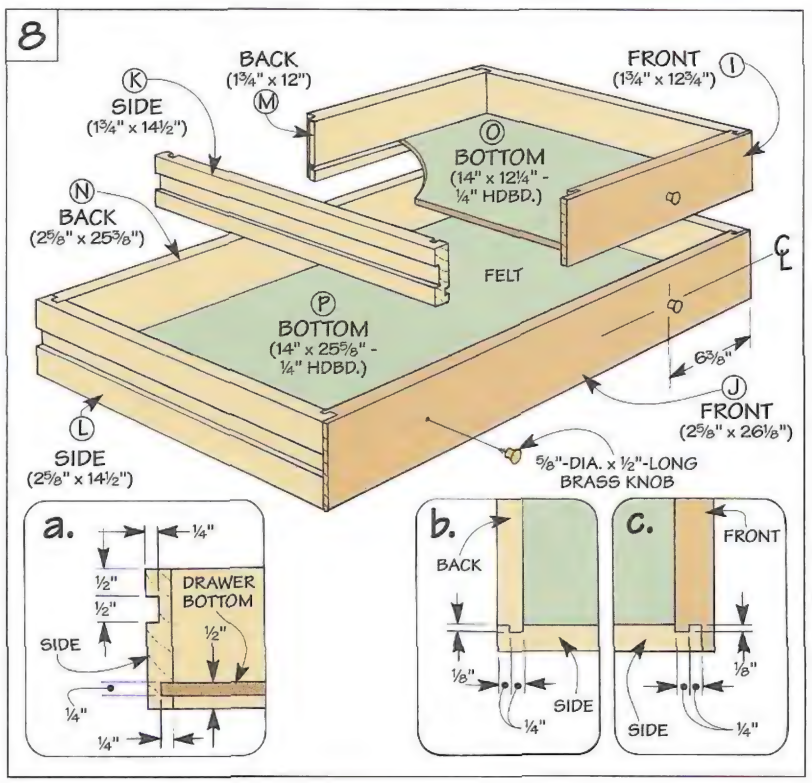
Other than that, building the drawers is fairly straightforward. After cutting the *drawer fronts (I, J)*, *sides (K, L)*, and *backs (M, N)* to size, it's just a matter of cutting the locking rabbet joints, see Figs. 8b and 8c.

GROOVES. Before assembling the drawers, you'll need to cut the grooves in the side pieces for the drawer guides. To create a consistent 1/16" gap, the grooves are located 1/2" down from the *top* of each side, see Figs. 7a and 8a.

In addition to the grooves for the drawer guides, you'll also need to cut grooves for the 1/4"-thick hardboard *drawer bottoms (O, P)*, see Figs. 8 and 8a. Then just glue up the drawers.

FINAL DETAILS. To complete the chest, I added a set of brass knobs. These just screw into the drawer fronts, see Fig. 8. As a final touch, I lined the drawer bottoms with felt, see box at right.





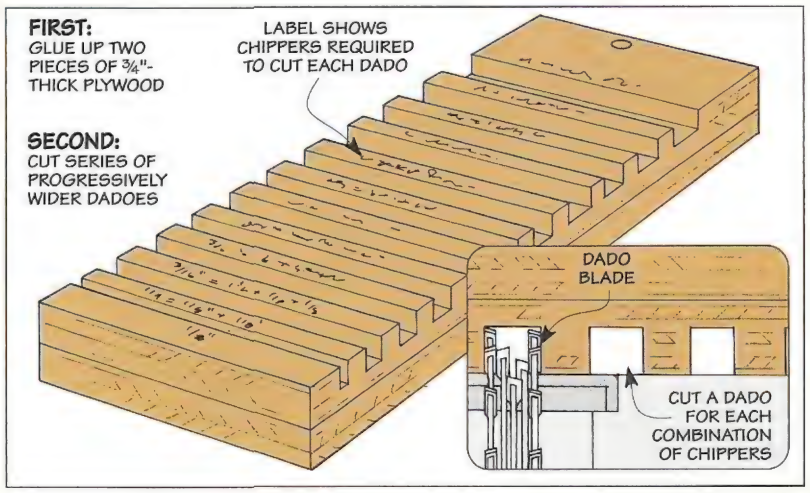
Felt Lining

Nothing shows off a set of fine hand tools better than a drawer lined with felt, see photo. And it's easy to install.

Using spray adhesive, attach an oversized piece of felt to a piece of posterboard that's cut to fit the drawer bottom. Then simply trim the felt to size and press it into the bottom of the drawer.

Shop Solutions

Dado Blade Gauge



■ Since my new stacked dado blade has a 1/32" chipper (in addition to the standard 1/16" chippers), it's ideal when cutting dadoes to accept "off-size" thicknesses of plywood.

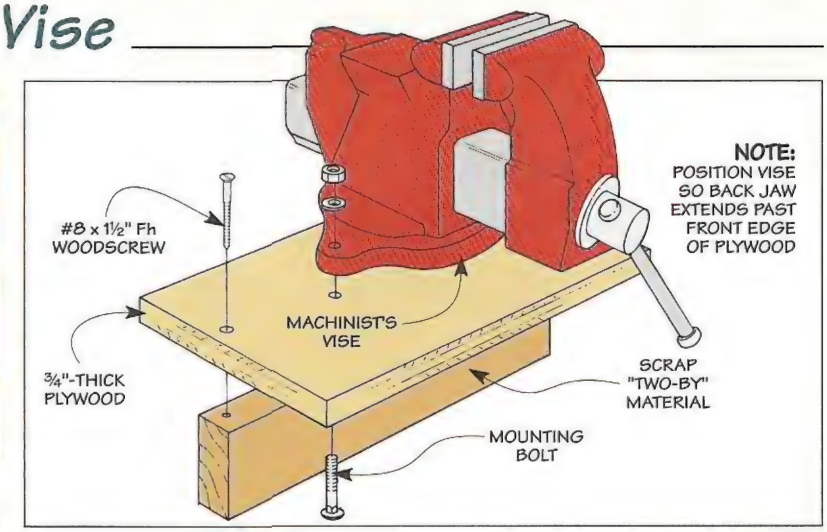
But it can take awhile to find the exact combination of chippers I need to produce a good fit. So I use this handy gauge to tell me at a glance which chippers to use, see photo.

The gauge is nothing more than two glued-up pieces of ¾"-thick plywood with a series of dadoes cut in it — one for each different width of dado that I can cut with my blade, see drawing. The chippers required to cut each dado are labeled underneath.

By test fitting the workpiece in each dado, it's easy to find the one that produces the best fit. Then read the label to get the right combination of chippers.

Doug Hicks
Urbandale, Iowa

Quick-Mount Vise



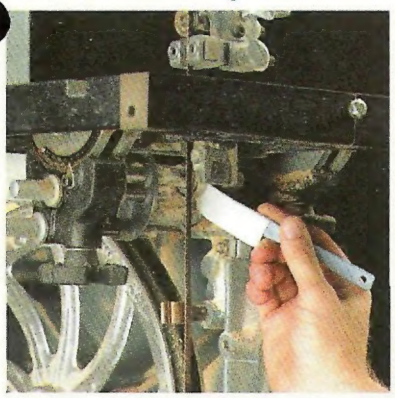
■ I don't use my machinists' vise all that much. So it's usually stored under my bench. But when I need to work with metal parts, I still want a quick way to secure the vise.

The solution is to bolt the vise to a T-shaped platform that tightens in the front vise of the workbench, see photo. It's just a ¾"-thick piece of plywood glued and screwed to a short scrap of "two-by" material, see drawing.

Note: To provide clearance for long, vertical workpieces, position the machinists' vise so the back jaw sticks out past the front edge of the plywood.

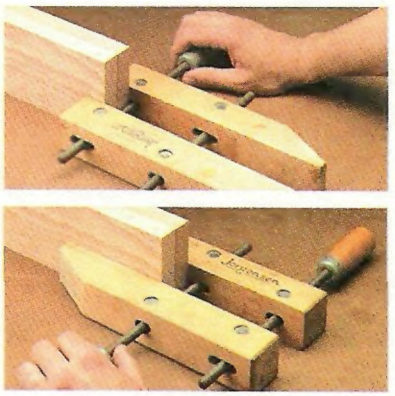
Joseph Ponessa
Moorestown, New Jersey

Quick Tips



▲ *To remove caked-on sawdust from his band saw, **R.B. Himes** of Vienna, Ohio scrapes it out with a simple kitchen spatula.*

▲ *When sanding by hand, **Sonny Rains** of Carbondale, Colorado protects his fingers with rubber pads he buys at office supply stores.*



▲ *To keep the jaws of a handscrew parallel, **Arnold Sax** of Hubbell, Michigan adjusts the back handle first, then the front.*

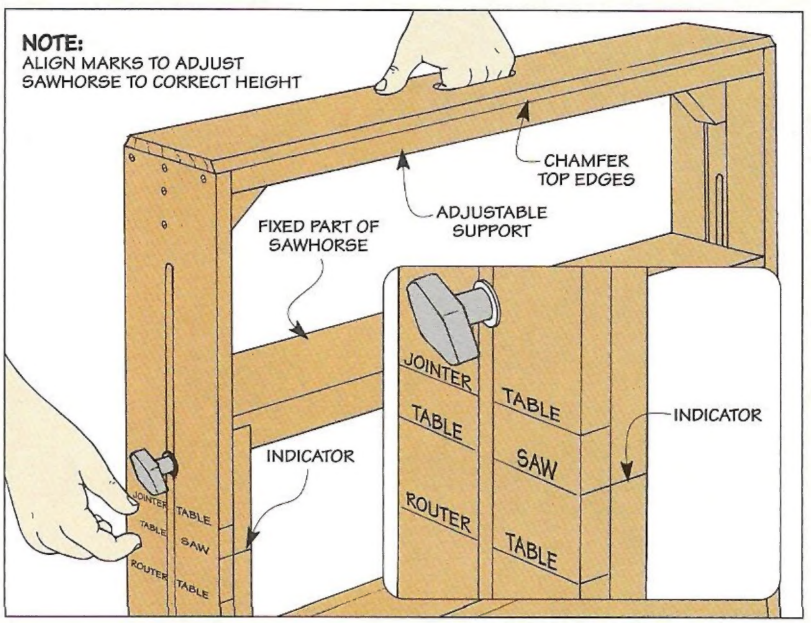
Sawhorse Outfeed

■ The adjustable sawhorse featured in *ShopNotes* No. 17 works great as an outfeed support for long pieces when I'm working at my stationary power tools.

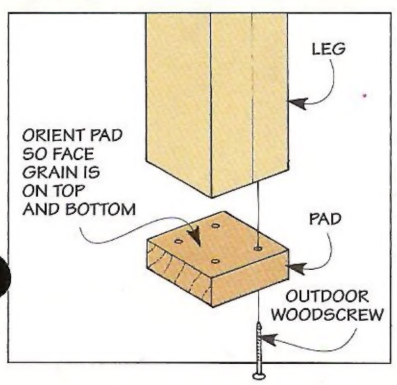
To quickly adjust it for the different heights of table tops, I marked each tool on the adjustable support. And a line on the fixed part of the sawhorse serves as an indicator. Aligning the two marks automatically sets the sawhorse at the right height.

Also, to keep the workpiece from accidentally "catching" the edge of the sawhorse, I routed a chamfer on each side.

Marty Harrison
Bend, Oregon



Leg Pad



■ Most pieces of outdoor furniture have one weak link — the bottom of the legs. That's because if the finish (or paint) cracks, the exposed end grain can soak up moisture.

To prevent this, I screw a wood pad (with face grain down) to the bottom of each leg, see drawing.

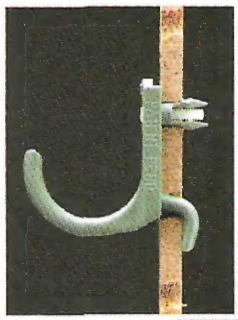
Kenneth D. Mady
Waltham, Massachusetts

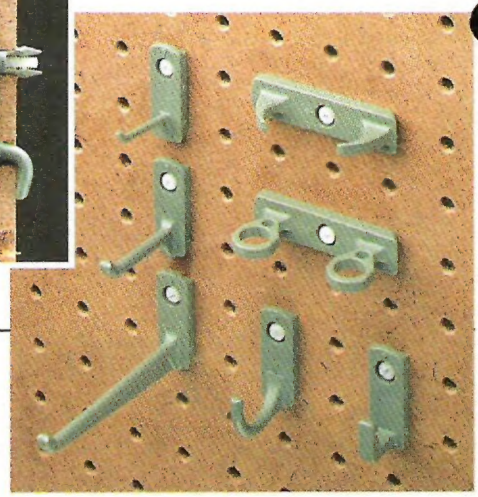
Send in Your Solutions

If you'd like to share your original solutions to problems you've faced, send them to: *ShopNotes*, Attn.: Shop Solutions, 2200 Grand Avenue, Des Moines, IA 50312. (Or if it's easier, FAX them to us at: 515-282-6741.)

We'll pay up to $200 depending on the published length. Please include a daytime phone number so we can call you if we have any questions.

New Products





Talon Perfboard Hooks

■ Lately, I get a big grin every time I take a tool off my pegboard storage rack. That's because the *Talon Perfboard Hooks* I'm using to hold them in place don't fall off like my old metal hangers.

These nylon tool hangers have two parts that work together to lock them in place: a hook and an expandable anchor. The hook fits in a hole in the pegboard just like a metal tool hanger. But the anchor is different. When you push a plastic screw into the anchor from the front, two wings spread out and grip the back of the pegboard, see inset photo.

To reposition a hook, simply back out the screw with a screwdriver, move the hook, and push the screw back in.

There are seven styles of hooks to choose from. They cost about 65¢ each, see Sources.

Sources

- *Talon Perfboard Hooks are available from:*
  Eagle America
  800-872-2511
  WoodsmithShop
  800-444-7002
- *CleanStream Filters are available from:*
  W.L. Gore & Associates, Inc.
  800-758-6755

Quick Tite Gel Matic

■ Like many woodworkers, I occasionally use "super glue" (cyanoacrylate) to glue up small wood parts. To keep the mess to a minimum, I use the glue that comes in a gel instead of the thin, runny liquid.

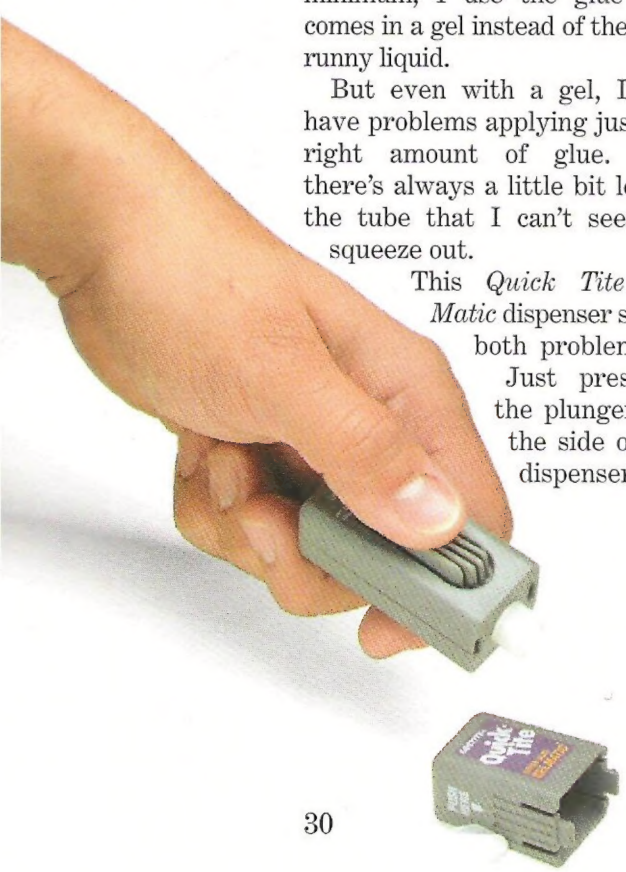
But even with a gel, I still have problems applying just the right amount of glue. And there's always a little bit left in the tube that I can't seem to squeeze out.

This *Quick Tite Gel Matic* dispenser solves both problems.

Just press in the plungers on the side of the dispenser to apply the exact amount of glue you need, see photo.

The tube seals tight after every use. And the dispenser ensures that every last bit of glue is squeezed out of the tube.

Note: We bought a tube of glue with the plastic (throw-away) dispenser at a local hardware store for $3.29.



CleanStream Filter

■ The first time I emptied my shop vacuum after installing a *CleanStream Filter*, I couldn't believe the bin was full of dust. With the old filter, I was lucky to collect a few inches of dust before needing to clean the filter.

What makes these filters work so well? The same waterproof, non-stick material that's used in some types of high-quality rain gear — *Gore-Tex*.

Because dust particles can't stick to this material, they fall off the filter when the vacuum is turned off. As a result, the filter doesn't clog.

These filters are designed for wet/dry shop vacuums. And they can be rinsed clean with water, so you can use them over and over again. They're available for most major brands of shop vacuums. Prices range from $21 to $30, see Sources.

Coloring Finishes

I've tried a number of different finishes that combine both a stain and a topcoat in one step. Although these finishes are easy to apply, sometimes it's hard to find just the right color.

So I often start with a clear finish and color it to get the shade I want. This provides a whole range of colors that I can't get out of a can.

ARTIST'S OIL COLORS. While there are several different types of coloring agents, one of the most readily available is artist's oil colors, see photo above. These are pigments that are ground in linseed oil. (They're sold in toothpaste-style tubes at most art supply stores.)

There's a wide range of artist's oil colors available. But you can create most wood tones with just a few basic colors. In fact, the warm color we used on the oak tool cabinet shown on page 16 is produced with just one color — Van Dyke brown.

But sometimes you'll need to mix several colors to get the shade you want. For example, combine burnt umber (brown), raw sienna (reddish brown), and cadmium yellow light to produce a country pine. Or create a rich cherry color with burnt sienna (maroon), cadmium yellow light, and permanent red. (See margin for our "recipes.")

MEATLOAF. But just as someone else's meatloaf is never quite as good as the home-cooked version, these colors might not be what you're looking for. So you may want to mix your own.

HOME BREW. To avoid wasting material, start by mixing up a small batch, keeping track of the *amount* of each color you use, see Step 1 below. After blending the colors together, stir the slurry into two tablespoons of the finish you plan to use, see Step 2.

FINISH. Because it creates a nice, soft sheen, I often use 100% pure tung oil. But for a glossier (and more durable) finish, a thinned-down varnish works well too.

COLOR TEST. Now you can test the color on a scrap piece. If the color isn't what you're after, don't be afraid to experiment a bit. Add some Van Dyke brown or burnt umber to darken a color. Or a touch of red or yellow as an accent. Just be sure to keep track of which colors (and the amount) you use.

BIG BATCH. Once you're satisfied with the color, you're ready to mix up a big batch of finish. Since it may be hard to duplicate the *exact* color, start with enough to easily finish the entire project. (I used a quart of tung oil for the oak tool cabinet.)

You'll also need to figure out the *total* amount (not just the number of parts) of artist's oil colors to use. Too much and the color gets muddy. Not enough and it looks washed out. About 3 tablespoons per quart of finish is just about right.

Now convert the number of "parts" of color you used on the measuring stick into some convenient measurement (like tablespoons). Then add these larger amounts to the finish, see Step 3. A plastic medicine container like the kind you find at a drug store makes a handy measuring cup.

Antique Oak

For 1 Quart Finish:

3 Tablespoons Van Dyke Brown

Country Pine

For 1 Quart Finish:

1½ Tablespoons Burnt Umber

1 Tablespoon Raw Sienna

½ Tablespoon Cadmium Yellow Lt.

Aged Cherry

For 1 Quart Finish:

1½ Tablespoons Burnt Sienna

1 Tablespoon Cadmium Yellow Lt.

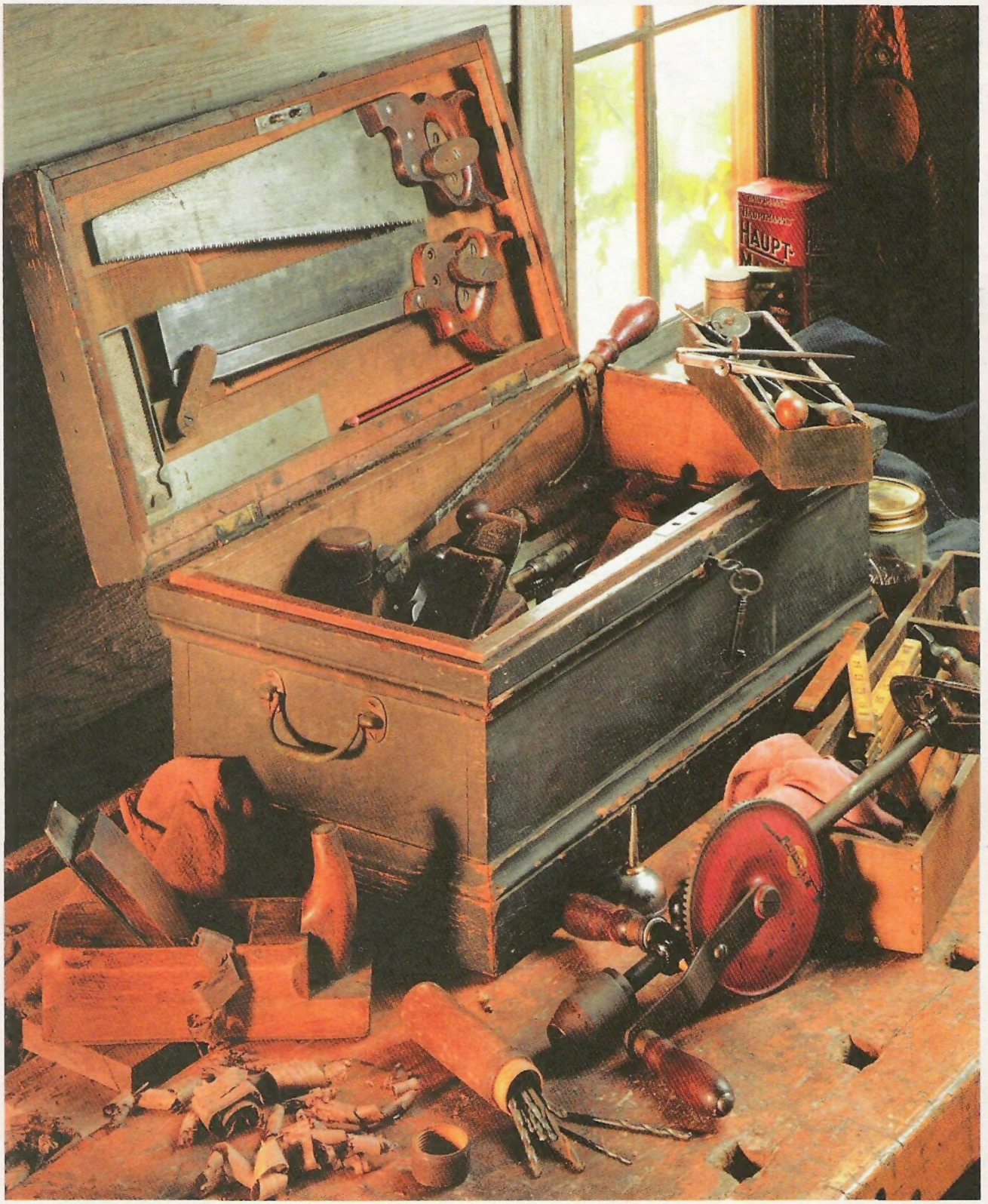
½ Tablespoon Permanent Red

1 *To keep track of the number of parts of each color you use, squeeze out equal amounts on a "measuring" stick.*

2 *After blending the colors together, stir the slurry into a jar containing two tablespoons of the finish you plan to use.*

3 *When mixing up a big batch of finish, use the same number of parts of artist's oil colors — just larger amounts.*

Scenes from the Shop



This sturdy old tool chest still holds the tools of the carpenter who built it. Whether it's a handsaw fastened securely in the lid, or the breast drill and smooth plane that are polished from years of use, each tool has its own special place in the chest. Together, they're a reminder of the solid craftsmanship that went into his work.